

# 2020



## Missouri Deer Season Summary & Population Status Report



**Missouri Department of Conservation**

Prepared by:

Deer, Elk, and Wildlife Health Program Staff

Science Branch



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# Deer Program Mission and Vision

The mission of the Missouri Department of Conservation's Deer Program is to use science-based wildlife management to maintain biologically and socially balanced deer populations that provide sustainable recreation and that minimize conflicts with humans and the potential for negative impacts on ecosystem health. To put this mission into action, the Deer Program is guided by four management goals:

**Goal 1: Deer Population Management** – Proactively manage deer populations for a balanced sex and age structure while maintaining densities at or below the biological and social carrying capacity within the defined management units using science-based wildlife management practices.

**Goal 2: Hunting and Recreation** – Provide opportunities for all citizens to enjoy deer and related recreational activities and promote hunting as a socially and culturally important tradition which is the primary tool for achieving deer population goals.

**Goal 3: Health and Disease Management** – Ensure the maintenance of healthy deer populations and minimize the threat and impacts of disease on deer populations in Missouri.

**Goal 4: Education, Communication, and Public Engagement** – Provide adequate information to the public about all aspects of deer management in Missouri and create opportunities for additional public engagement in decisions about the management of Missouri's deer resources.

The Deer Program, managed by the Science Branch, develops annual regulation recommendations based on harvest data, hunter and landowner surveys, MDC staff surveys, public comments, population simulations, and the Chronic Wasting Disease (CWD) Surveillance and Management Plan. The conservation of all of Missouri's valuable wildlife is made possible thanks to private landowners and all others supporting the one-eighth of one percent Conservation Sales Tax, permit sales, and income generated by fish and wildlife tourism.

## Thank you!



## Equal Opportunity to Participate

Equal opportunity to participate in, and benefit from, programs of the Missouri Department of Conservation is available to all individuals without regard to their race, color, nationality, sex, age, or disability. Questions should be directed to the Department of Conservation, PO Box 180, Jefferson City, MO 65102, 573-751-4115 (voice) or 800-735-2966 (TTY), or to the U.S. Fish and Wildlife Service Division of Federal Assistance, 4401 N. Fairfax Drive, Mail Stop: MBSP-4020, Arlington, VA 22203.

# 2020 Deer Season Overview

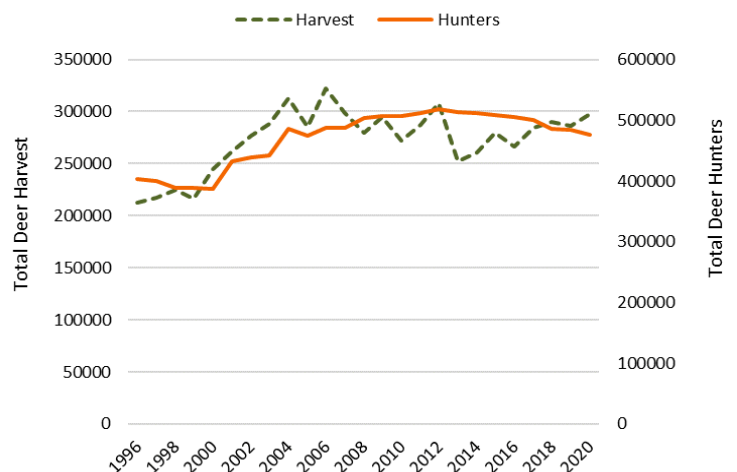
Season	Dates	What Was New for 2020?	
Archery Deer and Turkey Season	Sept. 15 - Nov. 13, 2020 Nov. 25, 2020 - Jan. 15, 2021	<ul style="list-style-type: none"> <li>Flood-prone areas in southeast Missouri were closed to hunting, except waterfowl, during deer and turkey seasons when river levels exceeded certain limits</li> <li>To slow the spread of CWD, there were new carcass transportation regulations</li> <li>Clark County was added to the CWD Management Zone</li> <li>During Nov. 14-15, hunters who harvested a deer in the CWD Management Zone were not required to take it to a CWD Sampling Station due to the COVID-19 pandemic</li> <li>The antler-point restriction was removed for Clark County and inside Columbia city limits</li> <li>Nonresident permit prices increased</li> <li>Hunters could no longer use a Firearms Antlerless Deer Hunting Permit in Atchison County</li> <li>Hunters could fill two Firearms Antlerless Deer Hunting Permits in Lincoln and Montgomery counties, and in Cass County outside the Kansas City urban zone</li> </ul>	<ul style="list-style-type: none"> <li>To qualify for no-cost resident landowner permits, you must own at least 20 acres in one contiguous tract</li> <li>Nonresidents who own at least 75 acres in one contiguous tract in Missouri could buy deer and turkey hunting permits at reduced prices</li> <li>To receive landowner permits, you must have submitted information about your property by filling out a Landowner Permit Application</li> <li>Qualifying landowners could receive two Resident Landowner Firearms Antlerless Deer Hunting Permits in Newton County</li> <li>Archery Antlerless Deer Hunting Permits could be used in Scott County</li> <li>New managed deer hunts were added, and others were removed or modified</li> <li>Deer hunting regulations changed for some conservation areas</li> <li>An elk hunting season was held in Carter, Reynolds, and Shannon counties</li> <li>There is a new definition for handgun</li> </ul>
Firearms Deer Early Youth Portion	Oct. 31 – Nov. 1, 2020		
Firearms Deer November Portion	Nov. 14-24, 2020		
Firearms Deer Late Youth Portion	Nov. 27-29, 2020		
Firearms Deer Antlerless Portion	Dec. 4-6, 2020		
Firearms Deer Alternative Methods Portion	Dec. 26, 2020 - Jan. 5, 2021		

Total deer harvest during the 2020 deer season (297,214) was 4% higher than the 2019 harvest total (**Table 1**). Compared to the 2019 deer season, antlered buck harvest was up 5% and was the highest on record. Doe harvest was up 3% and harvest of button bucks was up 2% during the 2020 deer season (**Table 4**). Firearms deer harvest (227,833) was 2% higher than during 2019. The archery deer harvest (67,487) was 10% higher than 2019 and was a new harvest record. Harvest during the November portion of firearms deer season (177,769) was 1% lower than in 2019. The early youth portion harvest total (15,854) was down 13% from 2019, whereas the late youth portion total (3,967) was up 103% from last year. Harvest during the alternative methods portion (14,623) was up 22% from last year, and harvest during the antlerless portion (15,620) was up 47% from 2019 (**Table 4**).

The slight decline in November portion harvest was expected given the poor weather (i.e., rain and high winds) that occurred throughout much of the state on opening weekend which is when about half of the November portion harvest typically occurs. Favorable weather during the late youth and antlerless portions contributed to large harvest increases during these portions when compared with harvest totals from 2019. Harvest during the shorter portions of deer season (e.g., youth portions) tends to be more variable given the greater effect of weather on deer movement and hunter effort during those shorter time periods.

**Table 1.** Total 2020 harvest by region compared to 2019, the 5-year average, and the 10-year average.

Region	Total Harvest	Difference from 2019	Difference from 5-Yr Avg.	Difference from 10-Yr. Avg.
Central	44,780	-5%	1%	3%
Kansas City	31,322	13%	12%	13%
Northeast	41,372	7%	3%	0%
Northwest	31,682	9%	8%	1%
Ozark	41,237	1%	0%	4%
Southeast	34,978	11%	7%	12%
Southwest	43,829	5%	6%	12%
St. Louis	28,014	-5%	3%	8%
<b>Statewide</b>	<b>297,214</b>	<b>4%</b>	<b>4%</b>	<b>6%</b>



**Figure 1.** Trends in total deer harvest and total deer hunters in Missouri, 1996-2020.

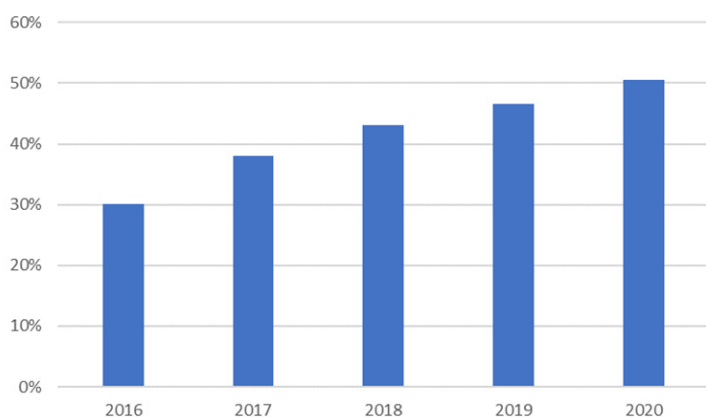
# 2020 Deer Season Summary

Deer populations across most of Missouri are currently at desired levels. Therefore, statewide deer management goals are largely focused on stabilizing deer numbers through increased antlerless harvest. Statewide deer management also continues to be focused on minimizing the impacts of CWD. Surveillance for CWD is ongoing across the state to detect new areas of infection as early as possible. Where CWD is known to occur, harvest is liberalized to maintain stable deer numbers and to remove additional infected animals. These measures help limit additional disease spread to healthy animals and new locations.

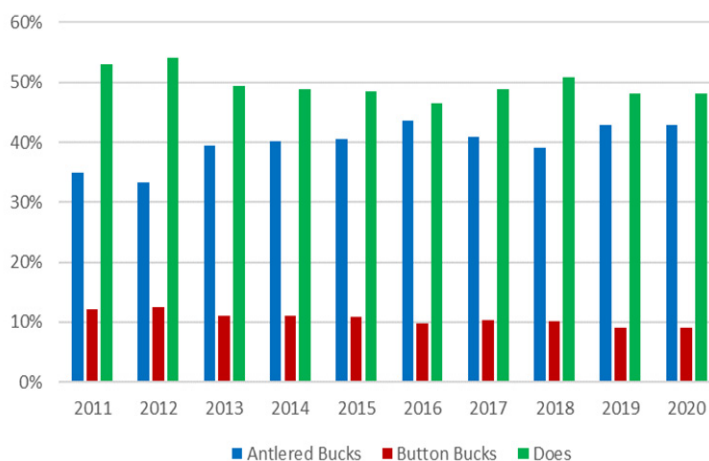
## Archery Deer Season

Prior to 2019, the archery harvest trend during the previous decade had remained relatively stable. However, during the last two years, the archery deer harvest has increased considerably (**Table 2**). The large increase in harvest since 2019 can be attributed primarily to the calendar shift which resulted in the November portion of firearms deer season starting about a week later than it did in 2018. As such, archery hunters had several more days to hunt before the November portion started. Early November is a great time to be deer hunting because bucks increase their movements and are more active during daylight hours during the rut. Typically, about 20% of the total archery season harvest occurs during the week prior to the November portion, so it isn't surprising that we have seen a large increase in the archery harvest the past couple years. In addition to season timing, participation during the archery season has exhibited an increasing trend as more and more hunters take advantage of the additional hunting opportunity that the archery season provides.

The 2020 archery deer season marked the fifth year of crossbows being a legal method for all archery hunters in Missouri. The Conservation Department began allowing crossbows during the archery season to increase hunter participation. Over the long-term, MDC hopes that allowing crossbows will recruit more youth and adult hunters into archery hunting, retain aging adult hunters that may not be able to draw vertical bows, and reactivate hunters that have previously participated in the archery season. During the 2020 archery season, 50% of the deer harvested were taken with crossbows. The percentage of the archery harvest comprised of deer taken with crossbows has increased each year since 2016 (**Figure 2**). Allowing crossbows during the archery season has not affected the composition of the archery harvest greatly. During the five years prior to allowing crossbows (2011-2015), the average percentage of antlered bucks, button bucks, and does in the archery harvest was 38%, 12%, and 51%, respectively. From 2016-2020, these averages were similar (42%, 10%, and 48%, respectively) (**Figure 3**).

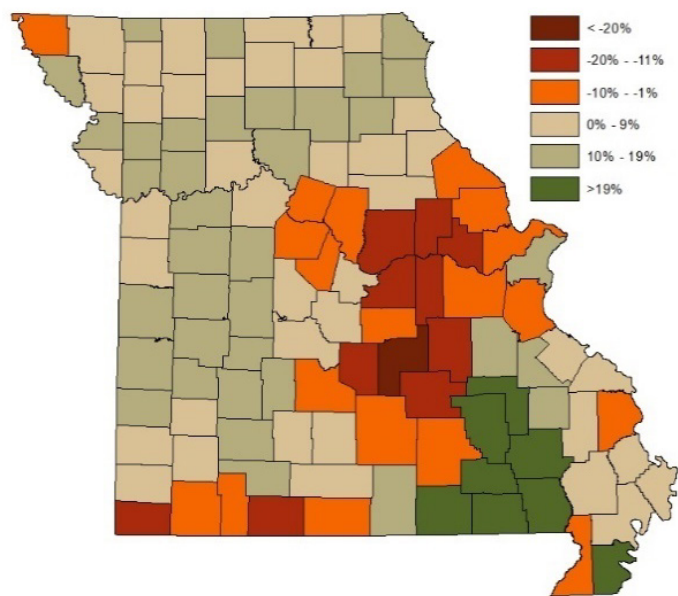


**Figure 2.** Percentage of the archery season harvest in Missouri comprised of deer harvested using a crossbow, 2016–2020. Crossbows became a legal method for all archery hunters to use starting in 2016.

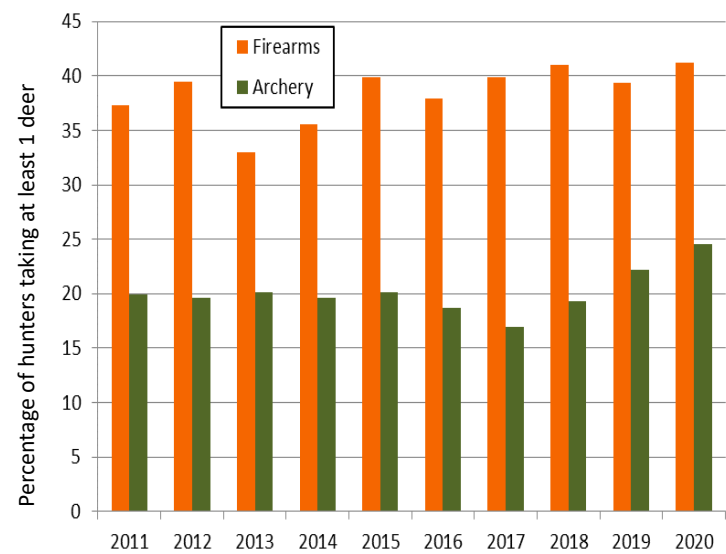


**Figure 3.** Percentage of antlered bucks, button bucks, and does in the archery season harvest in Missouri, 2011–2020.

# Archery and Firearms Season: By the Numbers



**Figure 4.** Percent change in total deer harvest by county in 2020 compared to the 2019 deer season.



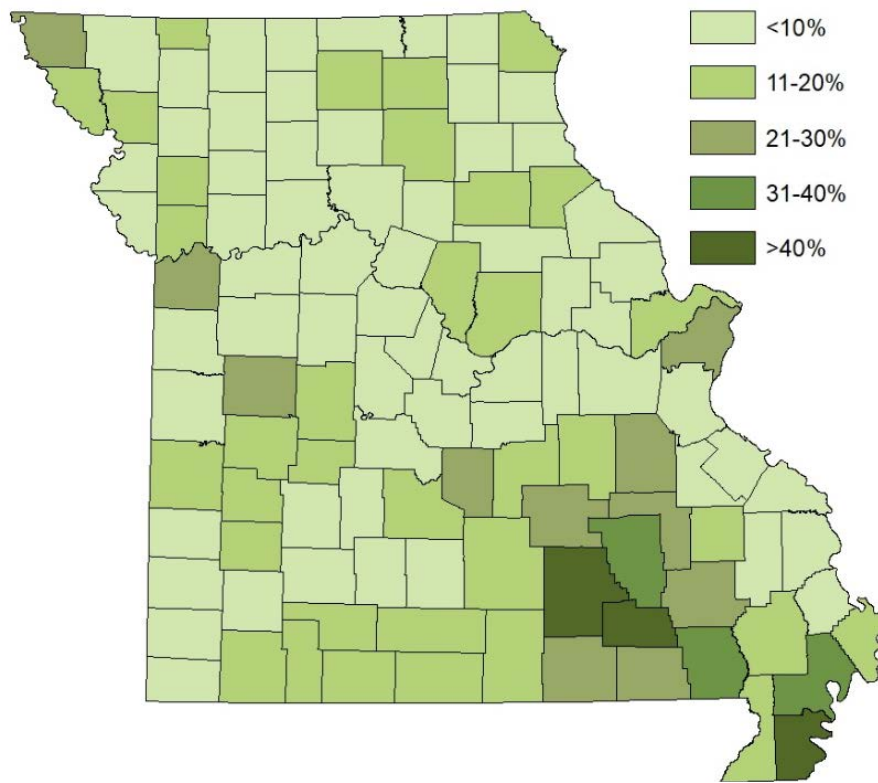
**Figure 5.** Success rates of firearms and archery deer hunters in Missouri, 2011-2020.

**Table 2.** Annual deer harvest summary by hunter residency, deer type, and hunting method, 2005-2020.

Year	Residency <sup>1</sup>		Deer Type			Method <sup>2</sup>		Total
	Resident	Non-resident	Button Bucks	Antlered Bucks	Does	Archery	Firearm	
2005	275,110	14,197	44,924	105,350	139,448	36,996	250,453	289,722
2006	308,103	17,167	47,372	125,193	152,892	41,942	281,011	325,457
2007	285,333	17,207	41,748	121,059	139,931	39,698	260,556	302,738
2008	266,599	17,106	40,574	100,682	142,737	42,914	239,094	283,993
2009	284,956	13,835	43,441	107,931	147,687	49,614	247,633	299,059
2010	261,134	14,290	38,473	104,794	132,426	42,467	231,466	275,693
2011	274,695	15,103	39,697	114,607	135,830	49,594	238,700	290,134
2012	293,825	15,713	42,155	120,491	147,214	51,122	256,927	309,860
2013	238,084	13,800	31,002	104,853	116,149	50,140	200,114	252,004
2014	242,020	14,930	29,943	114,409	112,720	48,566	206,885	257,072
2015	264,230	15,430	32,362	125,248	122,294	50,242	228,194	279,904
2016	249,339	16,542	28,016	128,311	110,267	47,734	217,508	266,594
2017	265,682	18,504	30,602	136,127	117,747	51,991	231,124	284,476
2018	269,948	20,119	30,115	136,849	123,260	52,915	235,732	290,224
2019	265,637	20,088	27,970	134,092	123,811	61,407	222,820	285,873
2020	274,746	22,333	28,652	140,855	127,707	67,487	227,833	297,214

<sup>1</sup> Does not include NULL records where residency specifications were not given.

<sup>2</sup> Does not include deer harvested during managed hunts.



**Figure 6.** Percentage of deer harvest on public land during the 2020 hunting season.

**Table 3.** Deer observations during the 2020 deer season by archery hunters participating in MDC's bowhunter observation survey.

2020 Bowhunter Observation Survey Data								
Region	Hours Hunted	Bucks Seen	Does Seen	Fawns Seen	Unknown Deer Seen	Total Deer Seen per Hour	Does per Buck	Fawns per Doe
Central	12,953	3,567	6,527	2,849	751	0.95	1.83	0.44
Kansas City	7,625	2,200	4,032	1,508	750	0.90	1.83	0.37
Northeast	14,774	4,992	7,723	3,651	946	0.85	1.55	0.47
Northwest	7,271	2,579	4,207	1,515	455	0.83	1.63	0.36
Ozark	7,264	1,197	2,719	1,187	519	1.29	2.27	0.44
Southeast	8,333	1,360	3,306	1,321	419	1.30	2.43	0.40
Southwest	8,050	2,027	4,758	1,774	462	0.89	2.35	0.37
St. Louis	10,354	2,380	4,033	1,792	631	1.17	1.69	0.44
<b>Total/Avg</b>	<b>76,623</b>	<b>20,302</b>	<b>37,305</b>	<b>15,597</b>	<b>4,933</b>	<b>0.98</b>	<b>1.84</b>	<b>0.42</b>



**Table 4.** Deer harvest by portion and deer type, 2019-2020.

Season Portion	Antlered Bucks			Button Bucks			Does			Total		
	2019	2020	Change	2019	2020	Change	2019	2020	Change	2019	2020	Change
Archery	26,331	28,891	10%	5,548	6,073	9%	29,528	32,523	10%	61,407	67,487	10%
Managed Hunts	506	545	8%	185	253	37%	955	1,096	15%	1,646	1,894	15%
Early Youth	11,663	9,786	-16%	1,541	1,381	-10%	5,085	4,687	-8%	18,289	15,854	-13%
Late Youth	771	1,476	91%	204	524	157%	975	1,976	103%	1,950	3,967	103%
November	91,917	96,298	5%	17,330	16,128	-7%	70,713	65,343	-8%	179,960	177,769	-1%
Alternative Methods	2,858	3,811	33%	1,585	1,834	16%	7,581	8,978	18%	12,024	14,623	22%
Antlerless <sup>1</sup>	46	57	24%	1,577	2,459	56%	8,974	13,104	46%	10,597	15,620	47%
<b>Total</b>	<b>134,092</b>	<b>140,855</b>	<b>5%</b>	<b>27,970</b>	<b>28,652</b>	<b>2%</b>	<b>123,811</b>	<b>127,707</b>	<b>3%</b>	<b>285,873</b>	<b>297,214</b>	<b>4%</b>

<sup>1</sup> Antlered bucks taken during this portion had antlers < 3" long.

**Table 5.** Permits issued and deer harvest by permit type, 2019-2020.

Permit Type <sup>1</sup>	Number of Permits			Number of Deer Harvested		
	2019	2020	Change	2019	2020	Change
Archery Any-Deer	121,651	146,030	20%	24,724	34,932	41%
Landowner Archery Any-Deer	91,301	53,324	-42%	6,926	4,255	-39%
Youth Archery Any-Deer	8,124	11,078	36%	1,337	2,119	58%
Archery Antlerless	64,259	80,986	26%	15,673	20,458	31%
Landowner Archery Antlerless	173,095	104,840	-39%	6,772	4,695	-31%
Youth Archery Antlerless	3,629	5,576	54%	563	985	75%
Firearms Any-Deer	279,249	313,788	12%	70,836	92,541	31%
Landowner Firearms Any-Deer	160,739	83,158	-48%	34,780	20,852	-40%
Youth Firearms Any-Deer	51,886	58,956	14%	19,184	22,703	18%
Firearms Antlerless	192,034	218,123	14%	55,056	65,629	19%
Landowner Firearms Antlerless	152,091	93,869	-38%	20,948	14,968	-29%
Youth Firearms Antlerless	25,879	30,736	19%	7,085	9,390	33%
Resident Firearms	826,638	763,191	-8%	207,984	211,167	2%
Nonresident Firearms	35,240	35,439	1%	14,127	14,916	6%
Resident Archery	445,021	382,367	-14%	55,995	60,786	9%
Nonresident Archery	17,038	19,467	14%	5,947	6,658	12%

<sup>1</sup> This table is not an inclusive list of permit types.

**Table 6.** Deer hunter and harvest statistics, 2020.

	Archery	Firearms	Archery & Firearms Combined
Age Distribution of Hunters	Number of Hunters		Total Hunters <sup>1</sup>
10 or younger	3,462	21,866	22,274
11-15	11,378	43,294	44,463
16-40	86,150	164,851	181,826
41 or older	106,016	213,699	226,701
Total hunters	207,006	443,710	475,264
Any-Deer Permits Issued	Number of Permits		Number of Hunters <sup>1</sup>
Resident	142,111	349,576	371,387
Nonresident	14,997	23,168	34,130
Landowner	53,324	83,158	83,512
Antlerless Permit Sales <sup>2</sup>	Number of Hunters		Total Hunters
1	50,257	171,673	155,207
2	10,631	31,173	50,727
3	2,342	3,075	12,456
4 or more	1,621	1,246	8,664
Deer Harvested	Number of Hunters		Number of Hunters <sup>3</sup>
0	156,244	261,060	265,956
1	39,065	145,038	149,742
2	8,555	31,547	42,844
3	2,108	5,231	11,232
4 or more	1,034	834	5,490
Antlered Bucks Harvested <sup>4</sup>	Number of Hunters		Number of Hunters <sup>3</sup>
0	178,777	333,199	344,803
1	27,510	109,878	121,095
2	719	633	9,366
Deer Harvested	Percent of Hunters		Percent of Hunters <sup>3</sup>
0	75.5%	58.8%	56.0%
1	18.9%	32.7%	31.5%
2	4.1%	7.1%	9.0%
3 or more	1.5%	1.4%	3.5%
Antlered Bucks Harvested <sup>4</sup>	Percent of Hunters		Percent of Hunters <sup>3</sup>
0	86.4%	75.1%	72.5%
1	13.3%	24.8%	25.5%
2	0.3%	0.1%	2.0%

<sup>1</sup> Number of individuals that held an archery and/or firearms any-deer permit.

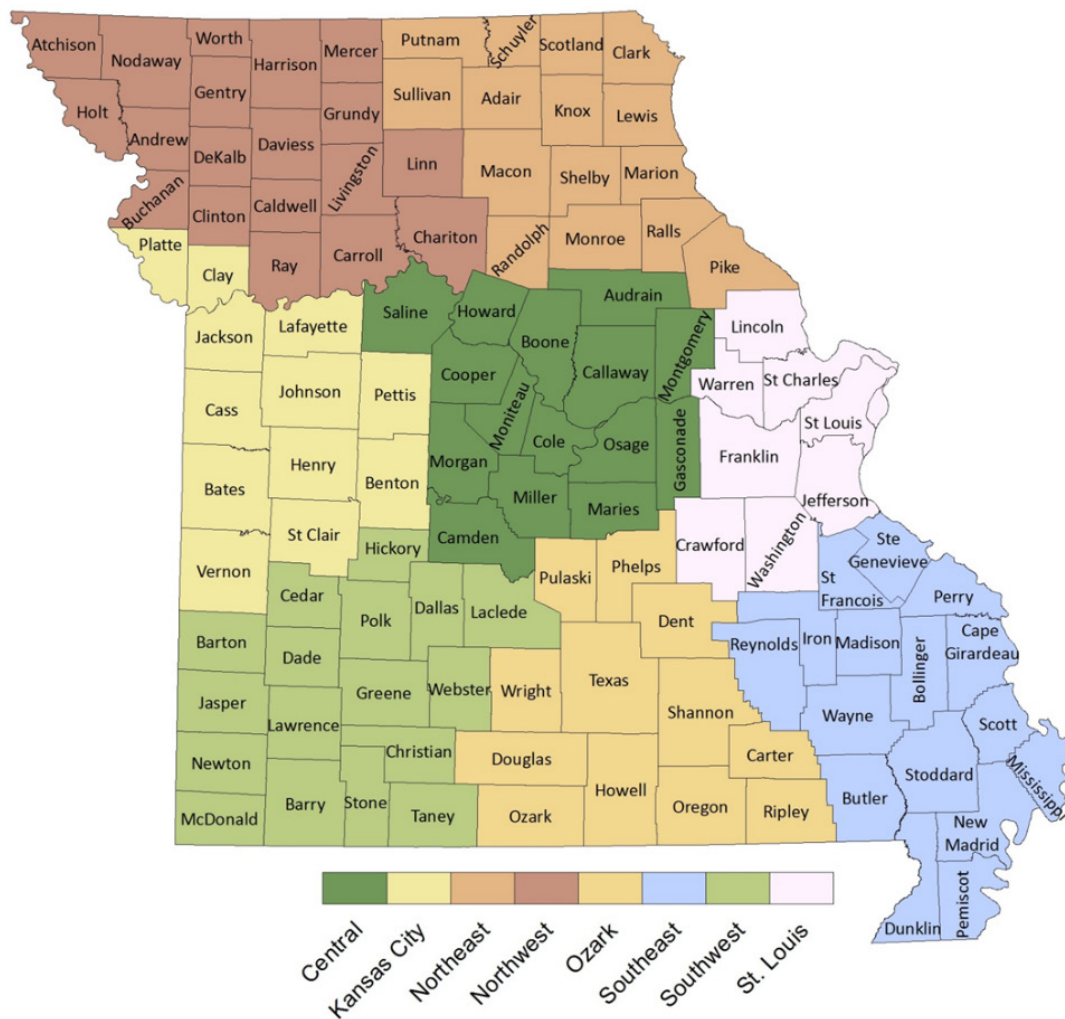
<sup>2</sup> Excludes no-cost landowner permits.

<sup>3</sup> Number/percent of hunters that harvested the specified number when combining their archery and firearms harvest.

<sup>4</sup> Includes hunters that harvested antlered bucks during managed hunts.

# Regional Deer Population Status

Statewide deer population trends are important; however, regional trends are more informative to most landowners and hunters. It is also important to recognize that deer populations can vary considerably within a region and even within a county. Regional and local diversity in deer numbers can be a result of differences in land cover and use, harvest regulations, hunter goals and density, and disease events. Therefore, regional information should be considered as a starting point when evaluating deer populations within a localized area.



## Regional Offices

### Central Region

3500 East Gans Road  
Columbia, MO 65201  
573-815-7900

### Kansas City Region

12405 SE Ranson Road  
Lee's Summit, MO 64082  
816-622-0900

### Northwest Region

701 James McCarthy Drive  
St. Joseph, MO 64507  
816-271-3100

### Ozark Region

551 Joe Jones Blvd.  
West Plains, MO 65775  
417-256-7161

### Southeast Region

2302 County Park Drive  
Cape Girardeau, MO 63701  
573-290-5730

### Northeast Region

3500 S. Baltimore  
Kirkville, MO 63501  
660-785-2420

### Southwest Region

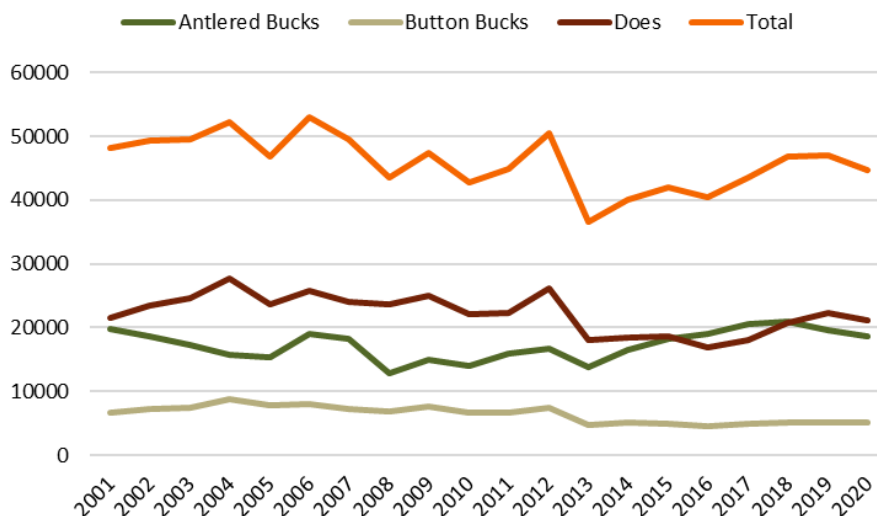
2630 N. Mayfair  
Springfield, MO 65803  
417-895-6880

### St. Louis Region

2360 Highway D  
St. Charles, MO 63304  
636-441-4554

# Central Region Deer Summary

In 2020, the Central Region had the highest regional deer harvest with a total of 44,780 deer (**Table 1, Figure 7**) which was 5% lower than in 2019. In 2020, the Central Region ranked 3<sup>rd</sup> among regions for the number of deer harvested per square mile at 5.4. Top harvest counties within the region were Callaway, Morgan, and Osage. The deer population across most of the Central Region has fully recovered from a low point in 2013 following a particularly severe outbreak of hemorrhagic disease in 2012.



**Figure 7.** Central Region harvest trend, 2001-2020.

County	Total Harvest	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Audrain	2,344	4.7	6.3	1.8	25.8
Boone	3,213	11.3	7.2	4.8	37.7
Callaway	4,988	9.8	7.9	4.2	39.7
Camden	3,694	9.0	7.1	3.3	26.5
Cole	1,720	9.6	11.1	3.4	34.4
Cooper	2,265	6.2	7.5	2.4	36.9
Gasconade	3,242	11.9	11.4	3.2	67.8
Howard	2,358	9.2	6.3	3.3	28.0
Maries	2,259	6.2	7.5	2.7	31.5
Miller	3,065	6.8	7.3	1.9	25.1
Moniteau	1,808	5.4	6.5	2.1	21.4
Montgomery	3,146	10.6	6.6	3.4	26.9
Morgan	4,494	10.1	5.8	2.7	28.8
Osage	4,021	10.5	7.6	2.9	34.6
Saline	2,163	4.1	7.2	1.7	30.5
<b>Total (t)/Avg (a)</b>	<b>t = 44,780</b>	<b>a = 7.9</b>	<b>a = 7.6</b>	<b>a = 2.9</b>	<b>a = 33.0</b>



# Kansas City Region Deer Summary

Total harvest for the Kansas City Region was 31,322 which was 13% higher than in 2019 (Table 1, Figure 8). The deer harvest in Kansas City Region ranked 7<sup>th</sup> among regions and 6<sup>th</sup> for the number of deer harvested per square mile at 4.4. Top harvest counties within the region were Benton, St. Clair, and Henry. The deer population across much of the region continues to increase from a low point in 2013.

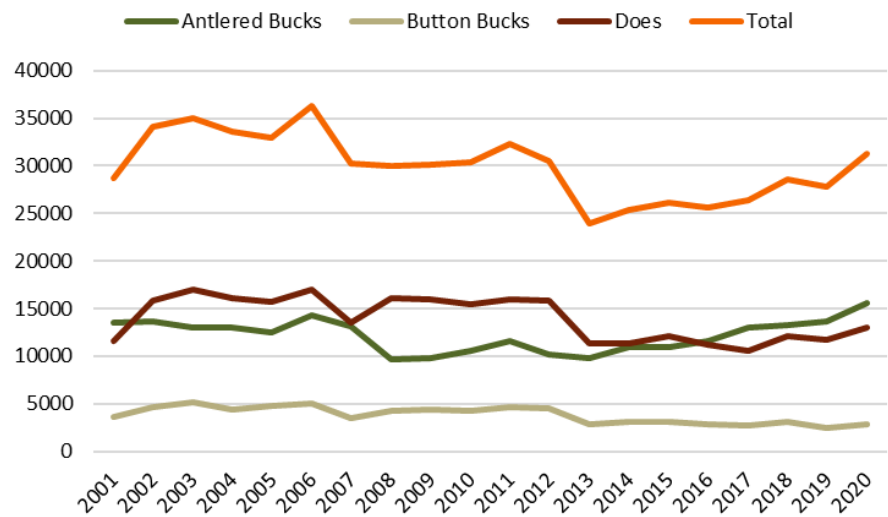
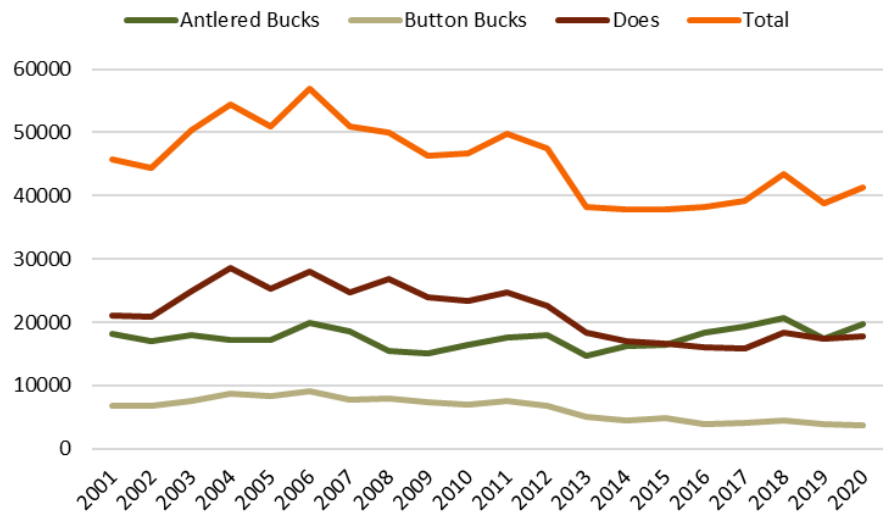


Figure 8. Kansas City Region harvest trend, 2001-2020.

County	Total Harvest	Firearms Hunters Per Square Mile	Trips per Kill (Firearms)	Archery Hunters Per Square Mile	Trips per Kill (Archery)
Bates	2,088	3.8	6.6	1.5	34.6
Benton	4,842	8.9	7.5	3.0	24.0
Cass	2,382	6.6	9.6	3.2	43.5
Clay	1,102	5.6	8.4	4.8	30.3
Henry	3,452	8.9	7.2	3.3	28.8
Jackson	1,987	5.6	6.7	5.2	20.1
Johnson	3,101	6.0	7.5	2.0	38.7
Lafayette	1,435	4.1	10.0	1.4	37.1
Pettis	2,859	5.0	6.4	1.4	24.9
Platte	1,131	5.7	9.4	3.7	25.8
St. Clair	3,839	6.8	6.1	2.6	21.8
Vernon	3,104	4.7	6.7	2.0	18.1
<b>Total (t)/Avg (a)</b>	<b>t = 31,322</b>	<b>a = 5.5</b>	<b>a = 7.7</b>	<b>a = 3.2</b>	<b>a = 29.0</b>

# Northeast Region Deer Summary

Total harvest for the Northeast Region in 2020 was 41,372, which was 7% higher than in 2019 (**Table 1, Figure 9**). The deer harvest ranked 3<sup>rd</sup> among regions, and the Northeast Region ranked 2<sup>nd</sup> for the number of deer harvested per square mile at 5.5. Top harvest counties were Macon, Pike, and Monroe. Following a considerable decline in deer numbers caused by a severe hemorrhagic disease outbreak in 2012, deer numbers in the Northeast Region have been slowly rebounding.

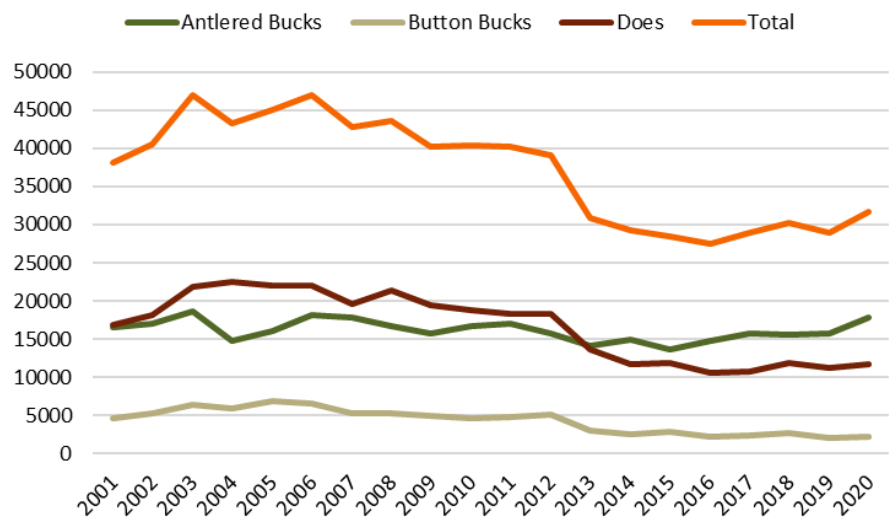


**Figure 9.** Northeast Region harvest trend, 2001-2020.

County	Total Harvest	Firearms Hunters Per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Adair	2,728	7.1	6.3	2.7	25.8
Clark	2,440	5.5	7.3	2.7	23.3
Knox	2,306	5.4	6.5	3.0	24.1
Lewis	2,162	6.3	7.7	3.0	25.0
Macon	4,415	5.6	6.6	1.9	33.5
Marion	2,187	5.5	8.4	2.2	27.9
Monroe	3,703	7.9	6.4	3.1	24.9
Pike	4,313	10.0	7.6	3.8	24.9
Putnam	2,650	6.7	5.0	3.1	27.6
Ralls	2,533	8.4	7.4	3.1	42.7
Randolph	2,530	7.3	6.3	2.4	24.5
Schuyler	1,563	6.7	5.8	2.5	26.3
Scotland	2,542	6.6	4.8	2.9	28.9
Shelby	2,585	6.8	6.1	2.5	27.5
Sullivan	2,715	5.9	5.9	2.3	23.7
<b>Total (t)/Avg (a)</b>	<b>t = 41,372</b>	<b>a = 6.4</b>	<b>a = 6.5</b>	<b>a = 2.7</b>	<b>a = 27.4</b>

# Northwest Region Deer Summary

In 2020, total deer harvest for the Northwest Region was 31,682, which was 9% higher than the 2019 harvest total (**Table 1, Figure 10**). The Northwest Region ranked 6<sup>th</sup> in total deer harvest and 8<sup>th</sup> in deer harvested per square mile at 3.4. Top harvest counties were Harrison, Linn, and Daviess. Over the past 15 years, deer population estimates and harvest in the Northwest Region have declined more sharply than any other region. These declines are attributed to habitat loss through conversion of grassland to row-crop agriculture, as well as a particularly severe hemorrhagic disease outbreak in 2012. Conservative harvest regulations have allowed the population to be rebounding in recent years.



**Figure 10.** Northwest Region harvest trend, 2001-2020.

County	Total Harvest	Firearms Hunters Per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Andrew	1,048	6.4	10.0	2.3	49.4
Atchison	594	2.9	12.1	1.1	31.9
Buchanan	809	5.4	10.1	1.7	57.4
Caldwell	1,580	7.6	7.3	2.4	30.4
Carroll	2,369	5.1	6.5	1.6	37.7
Chariton	2,067	4.9	7.4	1.7	31.1
Clinton	853	5.6	7.5	2.6	49.4
Daviess	2,510	6.6	8.2	1.9	30.6
DeKalb	948	5.5	8.0	2.3	64.2
Gentry	1,408	5.0	9.4	1.7	26.4
Grundy	1,825	5.6	5.0	2.0	30.9
Harrison	3,074	5.5	6.7	2.2	26.1
Holt	884	3.4	10.6	1.3	36.3
Linn	3,032	5.9	5.7	3.0	24.5
Livingston	2,052	4.5	7.5	2.0	28.3
Mercer	2,277	6.2	7.2	2.7	36.4
Nodaway	1,654	3.0	10.6	1.2	23.9
Ray	1,561	5.6	8.6	1.7	70.8
Worth	1,137	5.9	5.9	3.0	18.4
<b>Total (t)/Avg (a)</b>	<b>t = 31,682</b>	<b>a = 5.0</b>	<b>a = 8.1</b>	<b>a = 2.0</b>	<b>a = 37.1</b>

# Ozark Region Deer Summary

Total deer harvest in the Ozark Region in 2020 was 41,237, which was 1% higher than in 2019 (**Table 1, Figure 11**). The Ozark Region ranked 4<sup>th</sup> in total harvest and 5<sup>th</sup> in harvest per square mile at 4.6. Top harvest counties were Howell, Texas, and Oregon. The deer population in the Ozark Region has been increasing steadily as has been the case across much of southern Missouri due to historically conservative harvest regulations.

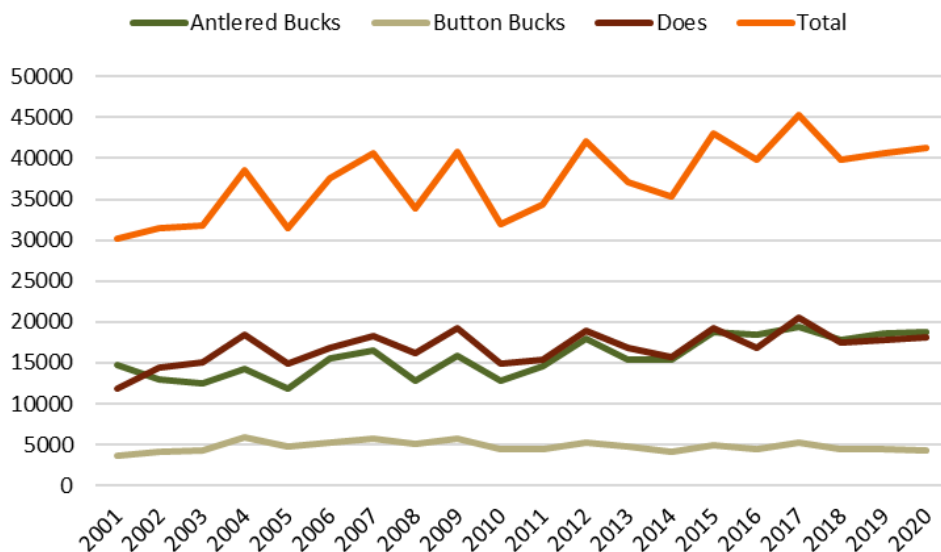


Figure 11. Ozark Region harvest trend, 2001-2020.

County	Total Harvest	Firearms Hunters Per Square Mile	Trips per Kill (Firearms)	Archery Hunters Per Square Mile	Trips per Kill (Archery)
Carter	2,543	7.8	11.4	3.0	21.3
Dent	3,413	5.6	8.6	1.6	36.3
Douglas	3,254	4.4	7.2	1.2	30.7
Howell	5,367	4.5	6.7	1.6	35.1
Oregon	4,183	4.1	5.3	1.2	27.5
Ozark	2,565	4.4	6.8	1.6	19.7
Phelps	2,381	8.6	11.6	2.7	39.1
Pulaski	2,212	8.2	9.9	3.8	40.4
Ripley	3,933	6.0	6.0	1.7	28.1
Shannon	3,243	3.3	7.3	1.2	31.0
Texas	4,927	4.7	7.0	1.3	34.5
Wright	3,216	4.7	6.2	1.5	26.3
<b>Total (t)/Avg (a)</b>	<b>t = 41,237</b>	<b>a = 5.1</b>	<b>a = 7.8</b>	<b>a = 1.9</b>	<b>a = 30.8</b>



## Southeast Region Deer Summary

Total deer harvest within the Southeast Region in 2020 was 34,978, which was 11% higher than in 2019 (**Table 1, Figure 12**). Among regions, the Southeast Region ranked 5<sup>th</sup> in total deer harvest and 7<sup>th</sup> in harvest per square mile at 4.0. Top harvest counties were Wayne, Bollinger, and Perry. The region has some of the most diverse habitat in the state causing the deer population and harvest to vary dramatically across the region. Like the Ozark Region, the deer population in the Southeast Region has been growing steadily for many years.

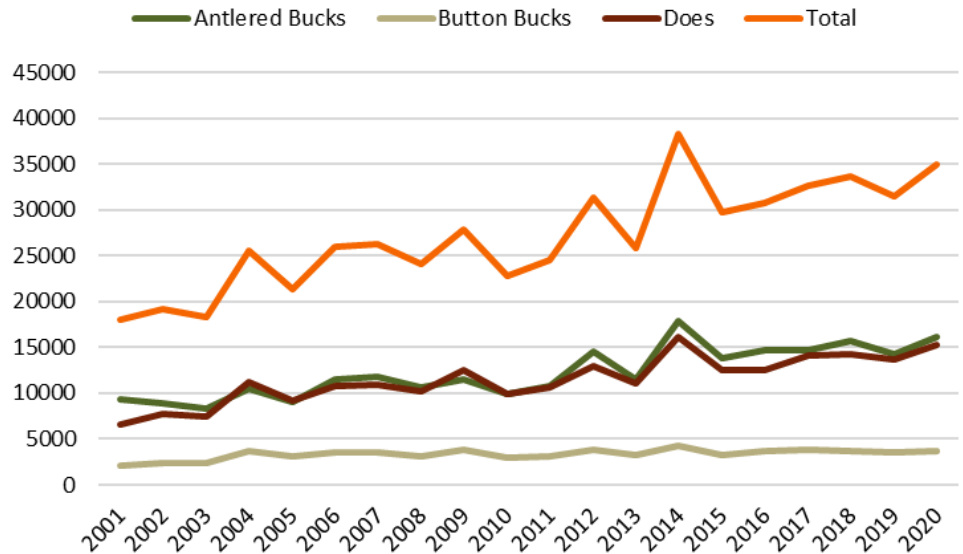


Figure 12. Southeast Region harvest trend, 2001-2020.

County	Total Harvest	Firearms Hunters Per Square Mile	Trips per Kill (Firearms)	Archery Hunters Per Square Mile	Trips per Kill (Archery)
Bollinger	4,527	11.5	7.9	3.3	41.7
Butler	2,239	5.6	10.8	2.5	48.9
Cape Girardeau	2,915	9.0	6.4	2.8	47.9
Dunklin	477	1.4	5.4	0.7	71.0
Iron	1,855	4.7	10.3	1.8	38.7
Madison	2,866	7.2	8.9	2.5	51.2
Mississippi	289	2.1	7.9	0.6	132.3
New Madrid	324	1.0	12.1	0.7	63.6
Pemiscot	175	1.0	12.3	0.8	197.4
Perry	3,081	10.5	7.3	3.0	24.5
Reynolds	3,010	4.4	5.9	1.8	35.6
St. Francois	2,959	9.9	8.4	4.1	36.5
Ste. Genevieve	2,661	10.9	10.1	4.0	69.2
Scott	775	3.6	11.7	1.6	46.2
Stoddard	2,282	4.1	8.5	1.8	25.9
Wayne	4,543	8.8	8.6	3.2	29.3
<b>Total (t)/Avg (a)</b>	<b>t = 34,978</b>	<b>a = 5.6</b>	<b>a = 8.9</b>	<b>a = 2.2</b>	<b>a = 60.0</b>

# Southwest Region Deer Summary

During the 2020 hunting season, 43,829 deer were harvested in the Southwest Region. This total was 5% higher than the 2019 harvest (**Table 1, Figure 13**). Regional deer harvest ranked 2<sup>nd</sup> among regions, and the number of deer harvested per square mile ranked 4<sup>th</sup> at 4.6. Top harvest counties were Dallas, Laclede, and Greene. The deer population has exhibited a slowly increasing trend over time, due in large part to historically conservative harvest regulations within the region.

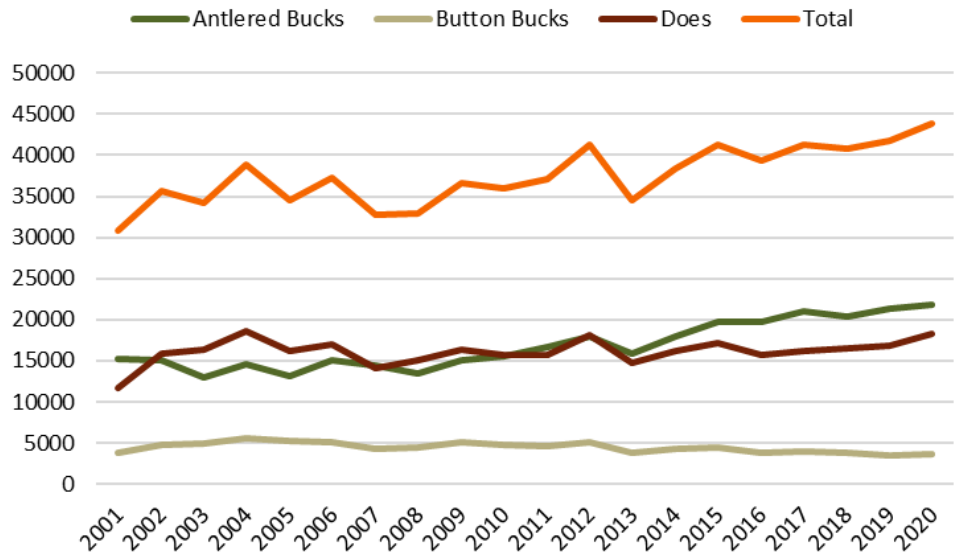
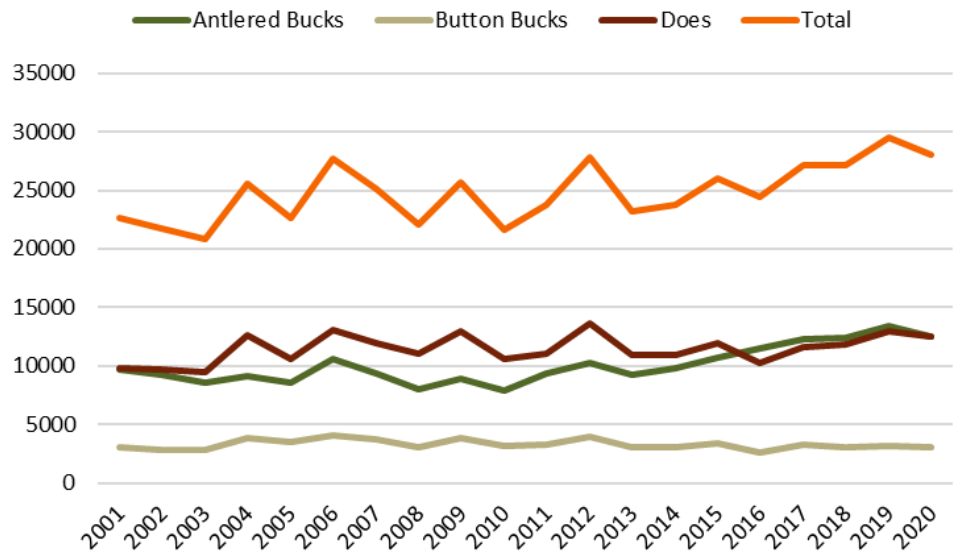


Figure 13. Southwest Region harvest trend, 2001-2020.

County	Total Harvest	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Barry	2,266	4.9	10.1	1.7	42.7
Barton	1,948	3.7	6.3	2.3	30.1
Cedar	2,655	6.9	6.3	1.8	30.9
Christian	2,354	7.5	6.1	3.4	26.5
Dade	1,673	4.6	6.9	2.2	35.7
Dallas	3,976	8.3	6.8	2.4	24.8
Greene	3,279	8.6	6.2	5.7	21.2
Hickory	2,870	8.3	5.4	3.3	23.4
Jasper	2,506	5.7	5.3	2.3	55.9
Laclede	3,689	6.8	6.4	2.3	27.9
Lawrence	2,063	5.3	10.7	2.1	37.8
McDonald	1,617	10.8	6.6	3.9	22.5
Newton	2,627	6.2	8.6	2.7	26.7
Polk	3,269	6.5	6.6	2.6	22.9
Stone	1,751	5.7	7.3	3.2	31.2
Taney	2,061	5.5	7.7	2.3	38.2
Webster	3,225	7.5	7.3	3.0	44.0
<b>Total (t)/Avg (a)</b>	<b>t = 43,829</b>	<b>a = 6.3</b>	<b>a = 7.1</b>	<b>a = 2.8</b>	<b>a = 31.9</b>

# St. Louis Region Deer Summary

A total of 28,014 deer were harvested in the St. Louis Region in 2020, which was 5% lower than the 2019 harvest (**Table 1, Figure 14**). The St. Louis Region ranked 8<sup>th</sup> in total deer harvest among other regions, but 1<sup>st</sup> in deer harvest per square mile at 6.2. Top harvest counties were Franklin, Jefferson, and Lincoln. The deer population in the St. Louis Region has been increasing slowly over time.



**Figure 14.** St. Louis Region harvest trend, 2001-2020.

County	Total Harvest	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Crawford	3,381	7.7	11.0	2.7	42.4
Franklin	5,911	10.6	8.5	4.4	29.8
Jefferson	4,850	11.3	7.5	7.0	36.4
Lincoln	3,621	10.1	8.2	4.0	32.5
St. Charles	2,044	6.2	12.2	4.8	48.3
St. Louis	2,339	6.1	6.6	12.2	11.9
Warren	2,493	10.3	9.1	4.8	37.0
Washington	3,375	6.6	10.3	2.6	52.7
<b>Total (t)/Avg (a)</b>	<b>t = 28,014</b>	<b>a = 7.7</b>	<b>a = 9.2</b>	<b>a = 5.3</b>	<b>a = 36.4</b>

# County Deer Population Status

Deer populations can be highly variable within a region and even within a county due to variation in habitat availability, harvest regulations, local hunter goals and density, amount of public and private land, and disease outbreaks (e.g., hemorrhagic disease). Therefore, county-wide assessments of deer population trends are not applicable to every local situation but are a general representation of the status and population trend.

The Deer Program evaluates a variety of data to assess county-specific deer populations and for hunting regulation development including:

- **Harvest data** —The total number and composition (antlered bucks, does, and button bucks) of harvested deer.
- **Population data** — Population simulations incorporating age-at-harvest data and estimated survival and reproduction rates.
- **Hunter, landowner, and staff surveys** — Hunters and landowners are randomly selected to receive mail surveys.
- **Public and staff input** — Input is received via email, the MDC website, public meetings, and phone calls.



Survey data is critical when assessing the deer population in relation to public acceptance levels. In cooperation with the USDA, we send out surveys statewide to agricultural producers to assess perceptions and attitudes toward deer populations and regulations. Additionally, we survey deer hunters annually to estimate hunter effort, hunter density, and opinions concerning deer populations and regulations. We also consider public comments received throughout the year via the web, letters, calls, social media, public meetings, and emails.

The Deer Program reviews this information annually on a county-by-county basis to classify the deer population status and trends. Socially acceptable levels (cultural carrying capacity) are the first thing we look at when classifying the status of the deer population. Although biological carrying capacity, or the habitat's limitations on the number of deer that can be supported, is included within our assessment, cultural carrying capacity is typically much lower. We aim for this goal because when deer populations are at biological carrying capacity, numbers are high enough to increase deer-human conflict. By monitoring population trends for each county, we can gain an understanding of population status and adjust harvest regulations accordingly.



The goal of MDC's Deer Management Program is to maintain stable deer populations within each county that are at a socially acceptable level for most stakeholders. Currently, deer populations are stable to increasing across most of Missouri and are generally at socially acceptable levels. Exceptions include portions of northwestern Missouri that are still recovering from a severe outbreak of hemorrhagic disease that occurred in 2012 as well as habitat loss due to conversion of grassland to row-crop agriculture. Across most of the state, the deer population has recovered from the population decline that occurred because of the hemorrhagic disease outbreak of 2012.



**Table 7.** County deer harvest totals by method of take and deer type, 2020.

County	Archery				Firearms				Totals <sup>1</sup>			
	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total
Adair	336	39	288	663	1,042	207	815	2,064	1,378	246	1,104	2,728
Andrew	109	16	95	220	519	57	251	827	628	73	347	1,048
Atchison	88	3	59	150	362	16	66	444	450	19	125	594
Audrain	196	62	233	491	827	194	832	1,853	1,023	256	1,065	2,344
Barry	232	43	204	479	921	148	717	1,786	1,153	192	921	2,266
Barton	180	30	206	416	843	102	582	1,527	1,023	132	793	1,948
Bates	203	28	149	380	985	147	576	1,708	1,188	175	725	2,088
Benton	413	101	573	1,087	1,560	418	1,721	3,699	1,979	534	2,329	4,842
Bollinger	286	131	565	982	1,509	450	1,586	3,545	1,795	581	2,151	4,527
Boone	383	71	417	871	1,097	243	1,001	2,341	1,480	314	1,419	3,213
Buchanan	97	10	64	171	382	41	215	638	479	51	279	809
Butler	283	78	365	726	875	128	504	1,507	1,159	207	873	2,239
Caldwell	155	20	132	307	725	101	445	1,271	881	121	578	1,580
Callaway	472	103	556	1,131	1,525	414	1,842	3,781	2,012	531	2,445	4,988
Camden	373	120	527	1,020	1,149	305	1,196	2,650	1,523	430	1,741	3,694
Cape Girardeau	190	55	322	567	1,138	195	1,015	2,348	1,328	250	1,337	2,915
Carrol	198	30	195	423	1024	177	745	1,946	1,222	207	940	2,369
Carter	260	79	425	764	971	175	557	1,703	1,261	264	1,018	2,543
Cass	299	42	244	585	1,026	126	644	1,796	1,326	168	888	2,382
Cedar	221	49	279	549	1,090	179	819	2088	1,321	228	1,106	2,655
Chariton	182	19	128	329	1,005	128	589	1,722	1,203	147	7,17	2,067
Christian	271	48	250	569	915	162	708	1,785	1,186	210	958	2,354
Clark	341	31	241	613	905	159	762	1,826	1,246	190	1,004	2,440
Clay	214	26	192	432	393	38	195	626	620	71	411	1,102
Clinton	80	11	79	170	398	60	224	682	479	71	303	853
Cole	160	33	211	404	510	171	635	1,316	670	204	846	1,720
Cooper	158	46	210	414	749	231	871	1,851	907	277	1,081	2,265
Crawford	302	81	343	726	1,208	341	1,106	2,655	1,510	422	1,449	3,381
Dade	131	23	117	271	753	124	525	1,402	884	147	642	1,673
Dallas	308	63	421	792	1,472	297	1,411	3,180	1,780	360	1,836	3,976
Daviess	247	40	265	552	1,025	158	772	1,955	1,273	198	1,039	2,510
DeKalb	92	6	55	153	454	64	277	795	546	70	332	948
Dent	191	58	308	557	1,272	336	1,248	2,856	1,463	394	1,556	3,413

<sup>1</sup> Includes deer harvested during managed hunts.

**Table 7.** County deer harvest totals by method of take and deer type, 2020 (continued).

	Archery				Firearms				Totals <sup>1</sup>			
County	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total
Douglas	255	49	258	562	1,400	241	1,050	2,691	1,655	290	1,309	3,254
Dunklin	48	8	56	112	219	27	119	365	267	35	175	477
Franklin	578	130	629	1,337	2,105	517	1,950	4,572	2,683	647	2,581	5,911
Gasconade	268	72	238	578	1,197	316	1,150	2,663	1,466	388	1,388	3,242
Gentry	142	17	117	276	680	83	369	1,132	822	100	486	1,408
Green	458	67	510	1,035	1,151	180	851	2,182	1,619	258	1,402	3,279
Grundy	187	17	183	387	744	114	580	1,438	931	131	763	1,825
Harrison	359	34	343	736	1,354	164	820	2,338	1,713	198	1,163	3,074
Henry	281	101	442	824	1,310	236	1,082	2,628	1,591	337	1,524	3,452
Hickory	261	72	272	605	1,050	241	961	2,252	1,311	314	1,245	2,870
Holt	105	12	72	189	452	46	195	693	559	58	267	8,84
Howard	205	40	228	473	906	168	770	1,844	1,114	219	1,025	2,358
Howell	396	80	529	1,005	1,880	435	2,044	4,359	2,276	517	2,574	5,367
Iron	191	46	198	435	808	144	468	1,420	999	190	666	1,855
Jackson	413	70	356	839	445	64	283	792	957	167	863	1,987
Jasper	346	21	288	655	1,107	109	633	1,849	1,454	130	922	2,506
Jefferson	618	153	874	1,645	1,539	324	1,341	3,204	2,157	477	2,216	4,850
Johnson	279	55	249	583	1,338	227	870	2,435	1,621	296	1,184	3,101
Knox	266	34	218	518	872	173	743	1,788	1,138	207	961	2,306
Laclede	339	67	390	796	1,385	264	1,232	2,881	1,725	331	1,633	3,689
Lafayette	124	17	127	268	636	98	433	1,167	760	115	560	1,435
Lawrence	200	37	212	449	907	128	578	1,613	1,107	165	791	2,063
Lewis	232	33	199	464	793	190	708	1,691	1,025	223	914	2,162
Lincoln	362	64	401	827	1,217	315	1,261	2,793	1,580	379	1,662	3,621
Linn	305	51	283	639	1,313	191	889	2,393	1,618	242	1,172	3,032
Livingston	211	26	185	422	868	128	633	1,629	1,080	154	818	2,052
Macon	450	77	424	951	1,752	333	1,377	3,462	2,202	411	1,802	4,415
Madison	201	80	339	620	1,009	271	966	2,246	1,210	351	1,305	2,866
Maries	173	63	240	476	747	216	820	1,783	920	279	1,060	2,259
Marion	228	40	238	506	743	193	745	1,681	971	233	983	2,187
McDonald	210	20	159	389	657	69	502	1,228	867	89	661	1,617

<sup>1</sup>Includes deer harvested during managed hunts.

**Table 7.** County deer harvest totals by method of take and deer type, 2020 (continued).

	Archery				Firearms				Totals <sup>1</sup>			
County	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total
Mercer	312	34	246	592	921	109	655	1,685	1,233	143	901	2,277
Miller	213	68	287	568	944	341	1,212	2,497	1,157	409	1,499	3,065
Mississippi	17	2	31	50	181	6	52	239	198	8	83	289
Moniteau	120	36	119	275	581	196	755	1,532	701	232	875	1,808
Monroe	331	71	384	786	1,283	335	1,266	2,884	1,617	414	1,672	3,703
Montgomery	270	71	304	645	1,072	282	1,146	2,500	1,342	353	1,451	3,146
Morgan	345	131	562	1,038	1,269	465	1,718	3,452	1,617	597	2,280	4,494
New Madrid	30	7	43	80	172	13	59	244	202	20	102	324
Newton	353	36	339	728	1,059	133	700	1,892	1,417	169	1,041	2,627
Nodaway	209	6	117	332	839	60	422	1,321	1,048	66	540	1,654
Oregon	319	80	358	757	1,440	400	1,584	3,424	1,760	480	1,943	4,183
Osage	301	93	369	763	1,199	390	1,622	3,211	1,517	489	2,015	4,021
Ozark	198	37	216	451	1,027	180	907	2,114	1,225	217	1,123	2,565
Pemiscot	12	7	23	42	71	15	47	133	83	22	70	175
Perry	147	43	275	465	1,132	243	1,241	2,616	1,279	286	1,516	3,081
Pettis	240	58	316	614	1,116	214	914	2,244	1,356	273	1,230	2,859
Phelps	224	63	269	556	785	240	799	1,824	1,010	303	1,068	2,381
Pike	409	75	531	1,015	1,403	350	1,527	3,280	1,815	429	2,069	4,313
Platte	202	20	210	432	406	41	251	698	609	61	461	1,131
Polk	291	57	353	701	1,294	242	1,029	2,565	1,586	300	1,383	3,269
Pulaski	258	70	305	633	651	211	717	1,579	909	281	1,022	2,212
Putnam	385	33	332	750	1,105	110	683	1,898	1,492	143	1,015	2,650
Ralls	266	60	238	564	868	226	875	1,969	1,134	286	1,113	2,533
Randolph	240	35	231	506	971	192	861	2,024	1,211	227	1,092	2,530
Ray	124	17	112	253	799	96	412	1,307	923	113	525	1,561
Reynolds	263	93	432	788	1,299	214	707	2,220	1,564	307	1,139	3,010
Ripley	279	90	381	750	1,378	370	1,435	3,183	1,657	460	1,816	3,933
St. Charles	265	54	254	573	540	119	551	1,210	908	207	929	2,044
St. Clair	352	80	415	847	1,540	284	1,168	2,992	1,892	364	1,583	3,839
St. Francois	260	84	384	728	1,018	257	882	2,157	1,285	358	1,316	2,959
St. Louis	520	125	742	1,387	310	62	243	615	936	224	1,179	2,339

<sup>1</sup> Includes deer harvested during managed hunts.

**Table 7.** County deer harvest totals by method of take and deer type, 2020 (continued).

County	Archery				Firearms				Totals <sup>1</sup>			
	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total
Ste. Genevieve	183	40	213	436	1,083	197	944	2,224	1,266	237	1,158	2,661
Saline	170	36	194	400	928	152	683	1,763	1,098	188	877	2,163
Schuyler	155	21	148	324	541	128	570	1,239	696	149	718	1,563
Scotland	269	53	263	585	845	196	916	1,957	1,114	249	1,179	2,542
Scott	63	12	107	182	343	34	215	592	407	46	322	775
Shannon	226	53	260	539	1,274	261	1,138	2,673	1,510	324	1,409	3,243
Shelby	266	46	258	570	903	170	942	2,015	1,169	216	1,200	2,585
Stoddard	248	84	413	745	775	156	544	1,475	1,049	244	989	2,282
Stone	208	33	203	444	663	108	536	1,307	871	141	739	1,751
Sullivan	361	34	269	664	1,166	121	764	2,051	1,527	155	1,033	2,715
Taney	234	46	234	514	764	152	629	1,545	999	198	864	2,061
Texas	345	87	394	826	2,105	360	1,634	4,099	2,452	447	2,028	4,927
Vernon	279	62	348	689	1,340	184	844	2,368	1,641	247	1,216	3,104
Warren	322	60	292	674	844	171	803	1,818	1,166	231	1,096	2,493
Washington	329	103	347	779	1,191	342	1,061	2,594	1,521	445	1,409	3,375
Wayne	385	188	737	1,310	1,593	376	1,245	3,214	1,986	566	1,991	4,543
Webster	263	75	279	617	1,302	250	1,055	2,607	1,565	326	1,334	3,225
Worth	212	9	134	355	507	29	246	782	719	38	380	1,137
Wright	276	47	277	600	1,366	246	1,004	2,616	1,642	293	1,281	3,216
Regional												
Central	3,807	1,045	4,695	9,547	14,700	4,084	16,253	35,037	18,547	5,166	21,067	44,780
Kansas City	3,299	660	3,621	7,580	12,095	2,077	8,981	23,153	15,540	2,808	12,974	31,322
Northeast	4,535	682	4,262	9,479	15,192	3,083	13,554	31,829	19,735	3,778	17,859	41,372
Northwest	3,414	378	2,864	6,656	14,371	1,822	8,805	24,998	17,807	2,200	11,675	31,682
Ozark	3,227	793	3,980	8,000	15,549	3,455	14,117	33,121	18,820	4,270	18,147	41,237
Southeast	2,807	958	4,503	8,268	13,225	2,726	10,594	26,545	16,077	3,708	15,193	34,978
Southwest	4,506	787	4,716	10,009	17,333	2,888	13,468	33,689	21,868	3,690	18,271	43,829
St. Louis	3,296	770	3,882	7,948	8,954	2,191	8,316	19,461	12,461	3,032	12,521	28,014
Statewide												
Totals	28,891	6,073	32,523	67,487	111,419	22,326	94,088	227,833	140,855	28,652	127,707	297,214

<sup>1</sup> Includes deer harvested during managed hunts.

# Deer Management on Private Lands—Improving Habitat for White-tailed Deer

Managed properly, Missouri's landscape can provide all the necessary food, cover, and water requirements of deer throughout the year. Deer have adapted to live in a variety of habitats; however, the health of a particular deer herd depends on the management decisions made by landowners and hunters. Land-use patterns and composition of the habitat also have a tremendous influence on deer populations and their movements. Enhancing the habitat quality for deer often requires an investment of time and money, but the resulting improvements in deer herd health and property use will be observed for many years. In general, three broad habitat types dominate Missouri: forests and woodlands, grasslands, and croplands. Once you have evaluated availability of each major habitat type on your property (see Pgs. 24-25 of the 2019 Missouri Deer Season Summary and Population Status Report), you will have a sense for where to begin making improvements.

## Forests and Woodlands

Managing forests and woodlands for deer habitat typically involves creating an initial disturbance, such as conducting a timber harvest or timber stand improvement (TSI), and then maintaining the disturbed area with prescribed fire. Disturbance techniques are meant to open the canopy and allow more sunlight to reach the soil. Increased sunlight stimulates the growth of nutritious woody browse and herbaceous (non-woody) vegetation closer to the ground, increasing forage availability and cover for deer. A good target is to maintain forested areas with at least 15-30% open canopy, and some small (<1 ac) forest openings without any overhead canopy are also beneficial.



**Figure 15.** An example of hinge cutting. Photo credit: [www.mossyoak.com](http://www.mossyoak.com)

Timber stand improvement practices involve selective tree removal to retain a diversity of tree species and to promote the growth and production of high-quality mast-producing trees, such as oak and persimmon. It is beneficial to promote both white oaks and red oaks to safeguard against a mast-crop failure of one variety or the other in a given year. Having a diversity of non-mast-producing trees in the forest or woodland stand, such as maples and elms, is also fine; however, they should not be allowed to dominate.

Tree felling through TSI can be done strategically to provide additional cover for deer and to direct deer movement. Trees felled on top of one another create wind screens that are used as thermal cover for deer during cold weather. Deer may also utilize loose brush piles for bedding or fawning cover at other times of the year. Felled trees can be used to direct deer movement toward or away from certain areas such as tree stands and property boundaries to enhance hunting opportunities and utilization of the property. Hinge cutting is a technique whereby a tree trunk is cut only enough to fell the tree, but leaving some of the outer trunk of the tree intact so that the tree remains living. This brings immediate forage within reach of deer while also providing cover.

Prescribed fire can be used to maintain early successional vegetation within a forest or woodland. Depending on the desired species composition, a fire return interval of 2-5 years is recommended. More frequent burning will promote herbaceous vegetation such as grasses and forbs, whereas less frequent burning will allow more woody species in the understory.



## Grasslands

The management techniques to implement in open areas dominated by pastures and grasslands will vary depending on the existing conditions. Grasslands dominated by perennial cool-season grasses such as tall fescue provide little cover or forage for deer, especially during cold winter weather when cover is in high demand. A mixture of native warm season grasses (NWSGs) and forbs (herbaceous flowering plants) provides nutritious forage and important cover during the summer and winter months. The transition into NWSGs and forbs often requires herbicide application to remove cool-season perennial grasses and allow native grasses and forbs to germinate from the seedbank. If native plant diversity is still not at desired levels several years following removal of the cool-season grasses, seeding may be needed to introduce desired plant species. Grasslands require frequent prescribed fire (every 1-2 years) to maintain herbaceous plant diversity and prevent woody plant encroachment. This is advantageous if providing forage is the primary objective. If some amount of woody vegetation is desired to increase cover, less frequent fire can be applied; however, more effort may be needed to control invasive species through hand-removal and/or herbicide application.



**Figure 16.** Prescribed fire is an efficient and economical strategy to maintain herbaceous plant diversity and prevent woody plant encroachment.

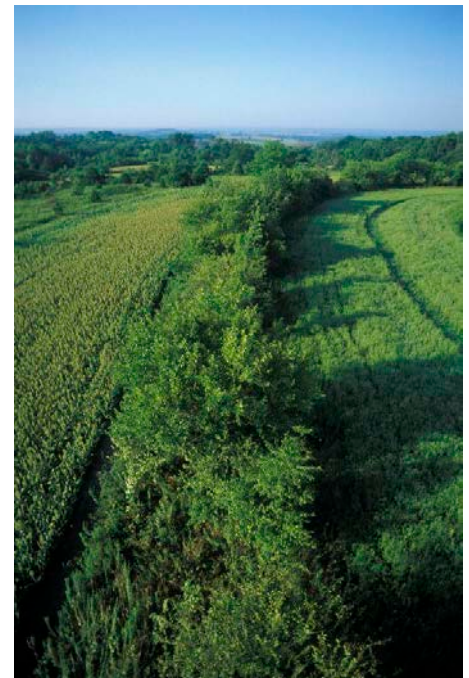
Grasslands do not need to be large, expansive areas to be worthwhile. Open areas such as utility right-of-ways, access or logging roads, fire breaks, or field edges should not be overlooked. These areas can provide valuable food resources to deer, and their benefit is augmented if the surrounding habitat is managed to provide cover. Cover near food is an important combination that can encourage deer to spend more time on your property.

## Croplands

Due to nutrient rich soils, croplands are often the most productive locations with potential to provide a tremendous quantity of high-quality forage or cover. Croplands can be managed for economic and wildlife benefits simultaneously or can be transitioned into areas for wildlife habitat with relatively little effort.

One way to benefit wildlife in croplands is to leave a small amount ( $\leq 10\%$ ) of the crop unharvested, providing a source of food and cover. After harvesting crops, avoid fall tilling so that crop residue is available to wildlife. Although recent advances in farming machinery have reduced the amount of crop residue, any uncollected grain can serve as a valuable winter food source for deer and other wildlife. Taken a step further, planting a fall cover crop of winter wheat, oats, cereal rye, clover, Brassicas (turnips, radishes, rape, kale), or some combination thereof, provides food for deer while also adding nutrients to the soil that will benefit future crop production.

Field edges are typically the least productive parts of a crop field, often due to receiving fewer hours of direct sunlight, so these areas provide an excellent opportunity to implement practices that benefit deer and other wildlife. Consider designating the first 30-50 ft of a field edge to be managed for NWSGs and forbs, which will provide food and year-round cover. Edge feathering is another technique whereby trees can be felled (completely or hinge-cut) along the edge of a field to enhance structure and provide a gradual transition between habitat types. Such “field-edge buffers” also serve as excellent fawning cover and are more difficult for predators to search compared to hard field edges that transition directly from woodland to open field, thereby giving a boost to fawn survival.



**Figure 17.** Physical barriers along crop field edges can provide great cover for deer, which can result in more deer sightings and greater hunting opportunities.

**For more information or assistance regarding habitat management on your property, contact your local Private Land Conservationist at [mdc.mo.gov/contact-engage](http://mdc.mo.gov/contact-engage).**

# Deer Research Projects

## Southeast Deer Cropland Study

A 3-year study began during 2016 in southeast Missouri to better understand deer movement ecology related to small soybean fields. To help us understand deer movement, MDC captured and fitted deer with GPS collars during the summer months from 2016-2018. A total of 76 adult does were collared. The GPS collars will help us understand how deer utilize the landscape and help to inform landowners and hunters about deer movements and target efforts to reduce deer densities, especially where deer are causing crop damage. The remainder of the collars were remotely removed from deer in May 2020 concluding the tracking portion of the study.

Crop damage assessments, crop damage manipulation, and crop planting timing are being investigated in addition to the collaring efforts. We know that the timing of the plant damage can impact yields in different ways, even leading to increases in yield in some cases. There may also be a correlation in the amount of damage and its impact on yield based on when the crop was planted during the growing season. Our goal is to provide that information to farmers as another way to understand and possibly minimize the impacts of deer damage on crop yield. Data collection efforts related to crop damage assessments, crop planting timing, and crop damage manipulation have concluded. Analyses are underway with final results and any management recommendations will be made available to the public and area landowners once complete.

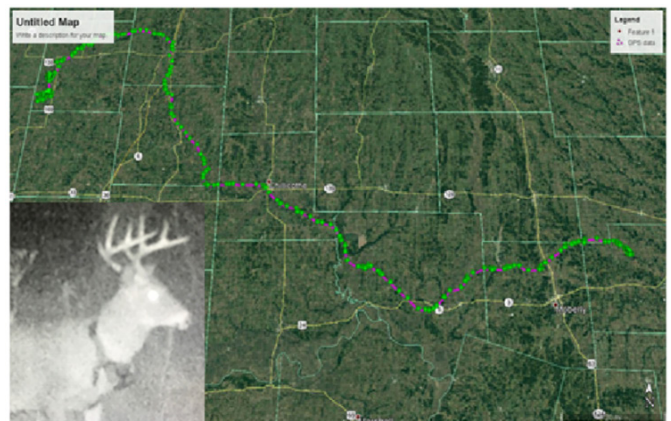


**Figure 18.** Crop damage assessments being conducted in a soybean field in 2017 to evaluate yield differences between protected and unprotected plants.

## Survival, Recruitment, and Movement Patterns of White-tailed Deer in Missouri

This was a 5-year study (2015-2019) designed to determine reproduction and survival rates, as well as examine movement patterns of white-tailed deer in two contrasting Missouri landscapes: the glaciated plains of northwest Missouri and the forested hills of the central Ozarks. Field work and data collection efforts have completed, and researchers with the University of Montana are analyzing the data and will continue to provide new findings as they become available.

In the 2018 Missouri Deer Season Summary & Population Status Report, preliminary results were provided regarding deer dispersal distances. Averaged across males and females, deer dispersed 5.0 miles from their natal home range in the glaciated plains and 3.7 miles in the Ozarks. Across both sites, roughly 93% of dispersals were less than 10 miles. However, on rare occasions, excursions occurred that were more extensive. One particularly noteworthy dispersal was made by an adult male in the glaciated plains. This individual was captured in January 2017 in Gentry County and aged at 2.5-years. Later that same year, he traveled roughly 185 miles over a 22-day period, starting on November 8. He was eventually seen on a trail camera by a landowner in Monroe County and reported to MDC.



**Figure 19.** The dispersal path of an adult male white-tailed deer across the glaciated plains ecoregion of northern Missouri in November 2017. Full details of the movement can be found in the article: "Moll, R. J., J. T. McRoberts, J. J. Millspaugh, K. H. Wiskirchen, J. A. Sumners, J. L. Isabelle, B. J. Keller, and R. A. Montgomery. 2021. A rare 300-kilometer dispersal by an adult male white-tailed deer. *Ecology and Evolution* 00:1-11.



# Age-at-Harvest Sampling

Over the last several years, the MDC Deer Program has partnered with meat processors, taxidermists, and university students to collect age and body-measurement data from hunter-harvested deer across the state. This information helps shed light on the annual composition of the deer harvest by sex and age, which is important for understanding how harvest is impacting different segments of the deer population and affecting future herd composition. It also helps inform the impact that different deer season regulations have on harvest composition and the deer population.

One such regulation that we can monitor the impacts of through Age-at-Harvest data is the antler-point restriction (APR), which requires a buck to have at least 4 points on at least one antler to be harvested in certain counties. The intent of the regulation is to protect yearling bucks, which typically have fewer than 4 points on one side, allowing them to survive until the next year. This increases the age-structure of the buck population as well as average antler size, which is desirable among some hunters.

Figure 20 shows the percentage of the harvest comprised of yearling bucks (orange bars) in counties that have historically had the APR. Counties that have had the APR have averaged roughly 88% of the buck harvest consisting of ≥2.5-years-olds indicating this regulation has been effective at protecting yearlings.

The Department removes the APR from counties that enter the Chronic Wasting Disease (CWD) Management Zone as part of its strategy for managing the disease. This is because yearling bucks, which are typically protected from harvest by the APR, disperse to new areas at a high rate. If infected with CWD, they can carry the disease with them and start new outbreaks. Allowing harvest of yearling males in the CWD Management Zone is intended to limit further disease spread (for more on CWD management, see Pages 27-30). CWD was first detected in Missouri’s wild deer herd in northern Missouri in 2012. In response, the APR was rescinded from 5 counties surrounding the CWD detection (Adair, Chariton, Linn, Macon, Sullivan). You can clearly see the impact this change had on the age composition of the buck harvest by comparing years with the APR in place (2011 and before) to years after the APR was rescinded (2013 and after; **Figure 21**).



**Figure 20.** Age composition of the buck harvest through time in counties that have an APR. Green represents bucks 2.5 years and older, orange represents bucks 1.5 years old.



**Figure 21.** Age composition of the buck harvest in 5 northern-Missouri counties that had an APR during 2011 and before, but did not during 2012 and after. Sample sizes were small during 2012; therefore, data from that year were omitted. Green represents bucks 2.5 years and older, orange represents bucks 1.5 years old.

# Elk in Missouri

Elk (*Cervus canadensis*), a native species in Missouri, disappeared from the state during the mid-1800s primarily due to unregulated hunting. Elk were reintroduced into Missouri in parts of Carter, Reynolds, and Shannon Counties between 2011 and 2013. This area was chosen for elk restoration due to the high amount of public land, low road density, and low amount of row-crop acreage. The target population is around 400-500 individuals, and the herd will be managed through regulated hunting.

Researchers with MDC, the University of Missouri, and the University of Montana have been busy monitoring the elk. Crews captured additional elk in Missouri from 2015-2018 to assess their health and to equip them with GPS collars. Capture of these individuals was part of regular monitoring efforts to better understand how elk are using the landscape, determine pregnancy status among cow elk, and to monitor survival. The ongoing research project wrapped up in late 2019, and researchers are busy analyzing the data collected throughout the project. So far, the information collected from these collars has helped researchers develop a model to track population growth and make sound management decisions. The population is currently estimated to be around 241 individuals, not including calves born in 2021.



As a result of the increasing number of elk, an annual growth rate exceeding 10%, and a high bull:cow ratio, the Department approved an initial framework for elk hunting in Missouri in the summer of 2019. In April 2020, the Conservation Commission approved a quota of 5 antlered elk permits for the first ever elk hunt in Missouri, which occurred in October and December of 2020. All five hunters harvested an elk and were rewarded with incredible memories.

In March 2021, the Conservation Commission approved 5 antlered elk permits for the second elk season to occur during the fall of 2021. Permits were distributed by a random lottery, and hunting will be permitted anywhere in Carter, Reynolds, and Shannon Counties, excluding the refuge portion of Peck Ranch Conservation Area. Missouri residents at least 11 years old and hunter-education certified (or exempt) were eligible to apply for \$10. A total of 9,714 people applied for the permits. Four permits were awarded to general applicants and 1 permit was awarded to a landowner with qualifying acreage in Carter, Reynolds, or Shannon counties. Each permit will cost \$50. The permits are valid during 2 hunting portions: a 9-day archery season, October 16-24, and a 9-day firearms season, December 11-19. As the population continues to grow, MDC will continually reevaluate hunting regulations and permit quota recommendations to maintain a healthy elk population and provide additional hunting opportunity.

For more information, visit [mdc.mo.gov](http://mdc.mo.gov) or contact the Deer and Elk Biologist at (573) 815-7901 ext. 2892

MO Elk Population Estimate	
June 2021	
Adult Cows	96
Adult Bulls	34
2 Yr. Old Cows	20
2Yr. Old Bulls	20
1 Yr. Old Cows	36
1 Yr. Old Bulls	35
Total	241*
* Does not include calves born in 2021	

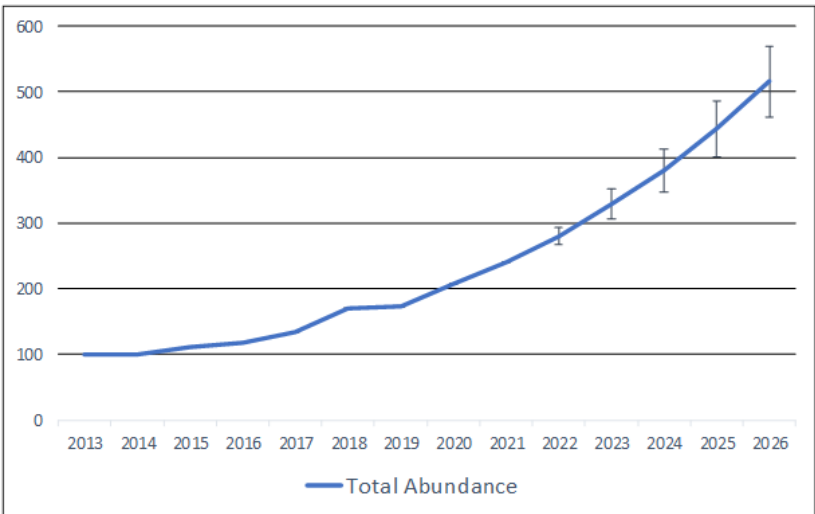


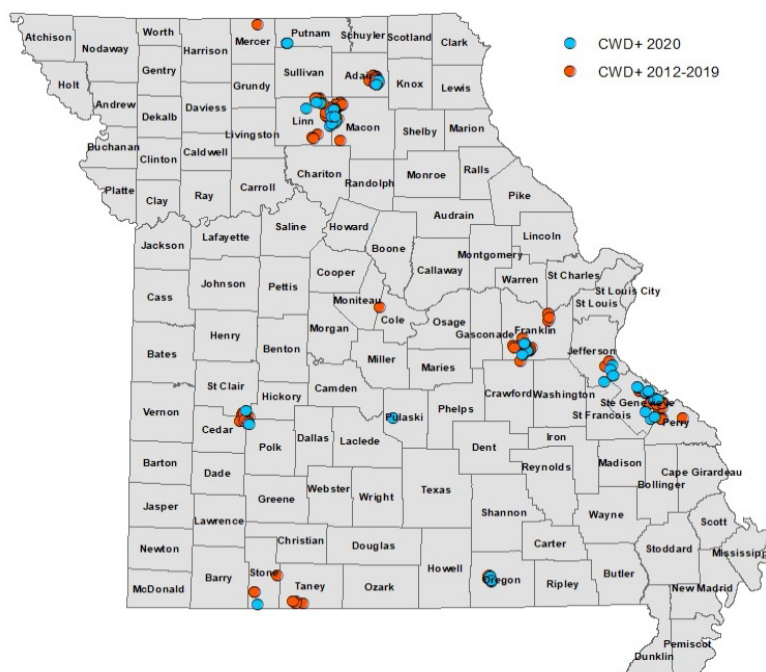
Figure 22. Elk population projection through 2026.



# Chronic Wasting Disease Overview

Chronic wasting disease (CWD) is a contagious, always fatal disease of deer, elk, and other members of the deer family. It spreads by direct animal to animal contact, through animal contact with saliva, feces, and carcass parts of infected animals, and by animal contact with contaminated soil, water, or plant material. There is no known cure, treatment, or vaccine for CWD. Over time, CWD can spread widely and infect a large percentage of a population. When CWD becomes widely established, survival rates decrease, and population impacts are expected. The best way to manage CWD is to prevent its introduction into new areas and limit its spread.

Routine, statewide CWD surveillance began in Missouri in 2002. Since that time, over 152,300 free-ranging deer have been tested for CWD. The disease was first detected in captive deer in Linn County in 2010, in captive deer in Macon County in 2011, and in free-ranging deer in Macon County in 2012. As of May 2021, CWD has been detected in a total of 206 free-ranging deer in 18 counties (**Figure 23**). While the continued spread of CWD into new areas of Missouri is concerning, the percent of CWD-positive deer where CWD is found remains low, and CWD remains relatively rare in the state.



**Figure 23.** CWD-positive free-ranging detections through May 2021.

County	Year of 1st Detection	Total CWD+ To Date
Adair	2014	21
Cedar	2017	1
Cole	2014	1
Crawford	2018	1
Franklin	2015	24
Jefferson	2016	9
Linn	2015	25
Macon	2012	47
Mercer	2018	1
Oregon	2018	10
Perry	2017	3
Polk	2017	8
St. Clair	2016	9
Ste. Gen.	2017	35
Stone	2018	4
Taney	2018	4
Pulaski	2020	1
Putnam	2020	2
<b>TOTAL</b>		<b>206</b>

## CWD and Human Health

There have been no known cases of CWD infection in humans, but research is ongoing and potential risks are unknown at this time. The Centers for Disease Control and Prevention (CDC) recommends that hunters have their deer tested before consuming it if hunting in an area where CWD has been found. The CDC also recommends not consuming meat from known CWD-positive animals. For more information, visit <https://www.cdc.gov/prions/cwd/index.html>.



## 2020 CWD Surveillance and Monitoring

Approximately 15,350 free-ranging deer were tested for CWD across Missouri during the 2020-2021 CWD surveillance year (July 1, 2020 - June 30, 2021), a nearly 52% decrease in samples compared to the over 32,200 deer tested in the previous surveillance year. The decrease was the result of the suspension of mandatory sampling requirements in CWD Management Zone counties for opening weekend of the firearms season due to concerns about the ongoing COVID-19 pandemic.

The majority of deer tested (12,364) for CWD in 2020-2021 were hunter-harvested, and of the hunter-harvested deer nearly 8,600 were sampled by partnering taxidermists and meat processors. Taxidermists and meat processors play a critical role in Missouri's CWD surveillance efforts, and these critical partnerships were even more important in 2020 due to the decrease in samples collected during opening weekend in the CWD Management Zone. Over 160 sick deer were also tested during the 2021-2022 surveillance year of which one tested positive for CWD. Testing deer displaying potential signs of CWD can play an important role in the early detection of CWD in new areas.

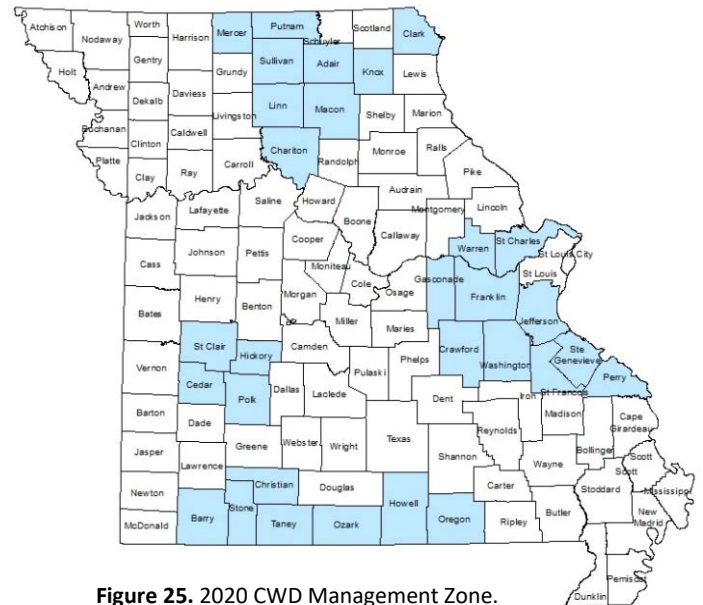


**Figure 24.** CWD-positive deer displaying clinical signs of the disease.

Of the approximately 15,350 deer tested for CWD during the 2020-2021 CWD surveillance year, 44 deer tested positive in the following 12 counties: Adair (2), Franklin (5), Jefferson (5), Linn (6), Macon (5), Oregon (3), Polk (1), Pulaski (1), Putnam (2), St. Clair (1), Ste. Genevieve (12) and Stone (1). CWD detections in Pulaski and Putnam counties were the first detections to date in each of these counties. The 44 CWD-positive deer included 24 hunter-harvested, 18 taken during post-season targeted culling, one road-killed, and one displaying symptoms of CWD.

## CWD Regulations Update

Regulations aimed to slow CWD spread were implemented within CWD Management Zone counties. The CWD Management Zone includes counties within 10-miles of CWD detections. For 2020-2021, the CWD Management Zone included 30 counties (**Figure 25**). Regulations include a ban on feeding and minerals, mandatory sampling requirements, removal of the antler-point restriction, and increases in antlerless deer harvest designed to prevent population growth. New for the 2020-2021 season, hunters in CWD Management Zone counties were restricted from transporting high-risk deer parts (carcass parts with the head and spinal column intact) out of the county of harvest unless being transported to a licensed taxidermist or meat processor within 48 hours of exiting the county.



**Figure 25.** 2020 CWD Management Zone.

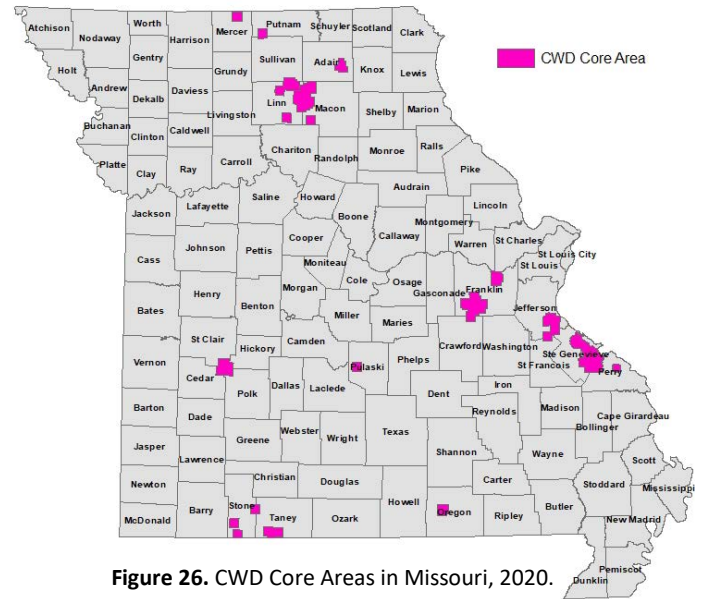
## CWD Management Permits & Targeted Culling

CWD Core Areas are designated in localized areas where CWD is detected (**Figure 26**). CWD Core Areas include each square-mile where a CWD detection occurs along with a 2 square-mile buffer. Increasing deer harvest in CWD Core Areas can slow transmission rates and limit the level of CWD in the environment by lowering deer densities and removing infected deer.

To increase harvest in CWD Core Areas, qualifying landowners are offered CWD Management Permits, allowing for harvest of deer of either sex during the deer season. During the 2020-2021 deer season, 702 deer were Telechecked on CWD Management Permits and 399 of these deer were tested for CWD. Four of the 44 CWD-positive deer detected during the 2020-2021 CWD surveillance year were harvested with a CWD Management Permit.

From January 16<sup>th</sup> through March 15<sup>th</sup>, MDC staff worked closely with cooperating landowners to remove additional deer within CWD Core Areas. Post-season targeted culling is one of the only known methods to directly slow CWD growth in areas where CWD is not widely established. Together, MDC staff and landowners removed 2,695 deer within CWD Core Areas (**Figure 26**) during targeted culling. Eighteen of the 2,695 deer tested positive for CWD. Meat from deer with a not detected CWD result was returned to landowners or donated to the Share the Harvest venison donation program.

Besides being an effective CWD management tool, targeted culling presents the opportunity to gather additional data, such as metrics of reproduction, to inform other aspects of local deer populations. The timing of conception is informative for hunters who want to focus their efforts on the time of peak rut in their area and helps ensure season timing is appropriate for meeting management goals. Timing of parturition, or fawning, is also important for land managers who may alter their activities around this time to promote fawn survival. Other metrics, such as pregnancy rates, fetuses per pregnant female, and fetal sex ratio are all indications of herd health and important for informing projections of deer herd growth over time.



**Figure 26.** CWD Core Areas in Missouri, 2020.

**Table 8.** Reproductive data collected during post-season targeted culling operations in CWD Core Areas, 2017-2021.

Region <sup>1</sup>	Female Age	n <sup>2</sup>	Average Conception Date	Average Parturition Date	Pregnancy Rate	Fetuses per Pregnant Female	Fetal Sex Ratio (M:F)
South	0.5	46	15-Nov	1-Jun	0.09	1.50	0.33
	1.5	39	9-Nov	25-May	0.67	1.19	1.33
	2.5+	287	8-Nov	25-May	0.91	1.70	0.96
	All	372	8-Nov	25-May	0.78	1.66	0.97
Central	0.5	0	NA	NA	NA	NA	NA
	1.5	2	NA	NA	NA	NA	NA
	2.5+	65	5-Nov	22-May	0.95	2.03	1.19
	All	67	5-Nov	22-May	0.94	2.02	1.20
East-Central	0.5	103	3-Dec	19-Jun	0.13	1.23	2.25
	1.5	106	17-Nov	2-Jun	0.88	1.58	1.23
	2.5+	554	13-Nov	31-May	0.92	1.85	1.22
	All	764	14-Nov	1-Jun	0.80	1.80	1.24
North	0.5	259	24-Nov	10-Jun	0.04	1.27	1.00
	1.5	188	8-Nov	28-May	0.90	1.69	0.91
	2.5+	1046	10-Nov	28-May	0.96	1.98	1.14
	All	1496	10-Nov	28-May	0.79	1.93	1.11
West-Central	0.5	128	29-Nov	15-Jun	0.03	1.25	1.50
	1.5	85	5-Nov	31-May	0.91	1.55	0.84
	2.5+	449	9-Nov	28-May	0.97	1.87	1.20
	All	663	9-Nov	29-May	0.78	1.82	1.14
Statewide	0.5	536	28-Nov	14-Jun	0.06	1.28	1.25
	1.5	420	10-Nov	30-May	0.87	1.59	0.98
	2.5+	2401	10-Nov	28-May	0.94	1.90	1.15
	All	3362	11-Nov	29-May	0.79	1.85	1.13

<sup>1</sup> Refer to **Figure 27** for regional designations.

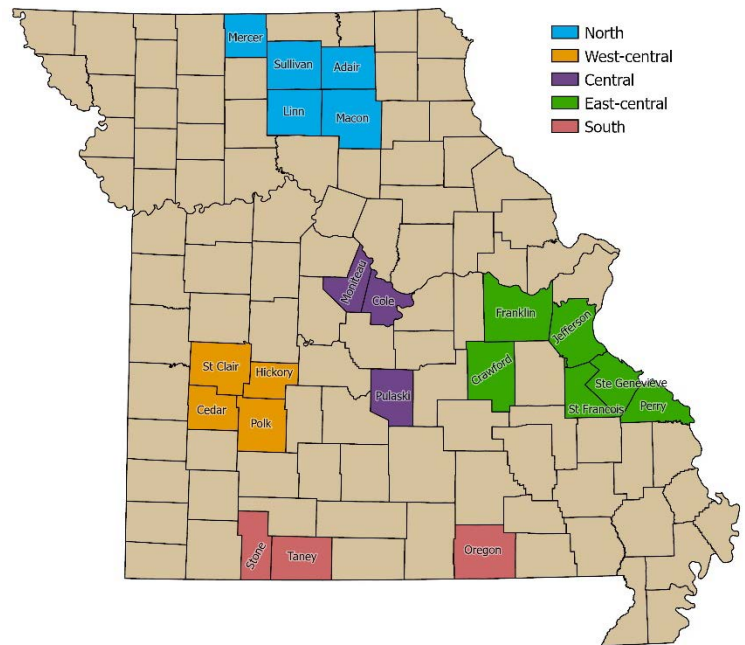
<sup>2</sup> Indicates number of deer.

# CWD Research Projects

## CWD Testing Technology Advancement

The Missouri Department of Conservation and the University of Missouri's College of Engineering and Veterinary Medical Diagnostic Laboratory has completed the second year of a three-year cooperative research project. This project strives to develop and validate testing methodology to detect significantly lower concentrations of prions (the agent that causes CWD) than current standard testing allows. This new technology has the potential to expand the availability and ease of environmental testing, provide faster and more convenient testing options for hunters, and improve the ability to test for CWD in live animals.

During year two of the project, the College of Engineering made advancements to adapt an existing microelectromechanical system (MEMS) biosensor, originally designed for the detection of low levels of bacterial pathogens and toxins based on antigen-antibody reactions, to detect CWD prions. Additionally, the Veterinary Medical Diagnostic Laboratory has stood up a known amplification assay, Real-Time Quaking-Induced Conversion (RT-QuIC), which is needed to assist in validation of the novel MEMS-biosensor's CWD detection capability. MDC staff continued to collect samples from deer taken during post-season targeted culling efforts to provide the research team samples from known CWD-positive deer. The research team will publish the results of this study upon its completion.



**Figure 27.** Regional designations for deer reproduction data collected post-season (see [Table 8](#)).

## CWD Prion Strain Typing

In 2019, the Missouri Department of Conservation entered a two-year agreement with the Colorado State University (CSU) Prion Research Center's Zabel Laboratory to support and participate in their ongoing project examining CWD prion strains. Comparing CWD prion strains may be able to inform theories about the origin and spread of CWD. Further, differences in prion strain-type can influence host specificity, transmission and clinical characteristics, and understanding these differences may inform a greater understanding of transmission dynamics, efficacy of management actions, and even potentially help assess the probability of cross-species infection. Characterizing prions is a long, multi-step process. To date, CSU has completed biochemical analysis of CWD-positive tissues from Missouri deer and is in the middle of its bioassay phase. Further results should be available later in 2021.

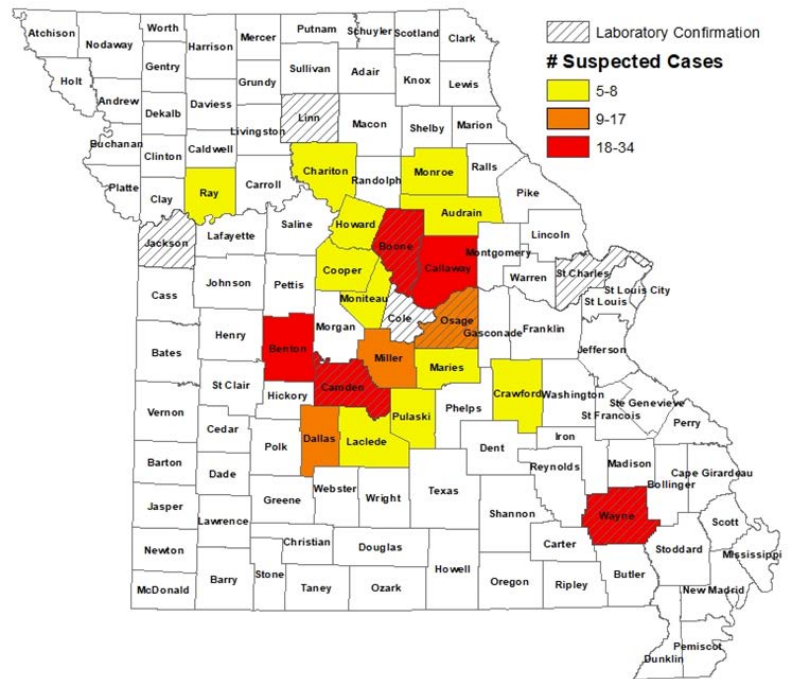
**For questions about CWD, visit [mdc.mo.gov/cwd](http://mdc.mo.gov/cwd) or contact the Wildlife Health Program Supervisor at 573-815-7901 x2934.**

# Hemorrhagic Disease Update

Hemorrhagic disease (HD) is a general term for illness in deer that is caused by two different viruses, Epizootic Hemorrhagic Disease virus (EHD) and bluetongue virus (BT). HD is spread to deer by tiny biting midges. In deer, symptoms of HD usually begin about 7 days after infection with the virus. Infected deer may have reduced appetite, weakness, and loss of fear of humans. Fever and swelling are common, and deer with EHD often have a swollen head, neck, tongue, or eyelids. HD can be fatal. Deer die quickly, within 8-36 hours, and are often found dead near water with little or no outward signs of infection. Neither EHD nor BT cause disease in humans.

These viruses occur naturally in Missouri and are most common between July and October. Small numbers of suspected HD cases are reported annually, though periodically large outbreaks and mortality in the state have been observed. The last severe hemorrhagic disease outbreaks were confirmed in Missouri in 2012 and 2013 (with 2012 being the most severe).

Hemorrhagic disease surveillance in Missouri is opportunistic and relies on reports of deer mortality from staff and the public. In 2020, Missouri experienced sporadic HD activity, with heaviest activity in the central part of Missouri (**Figure 28**). Two hundred eighteen suspect cases were reported. Laboratory confirmation of EHD-2 was found in 9 deer across 8 counties.



**Figure 28.** Confirmed and suspected hemorrhagic disease cases in deer in Missouri, 2020.







**Missouri Department of Conservation**